INDIA
PEOPLE AND ECONOMY

TEXTBOOK IN GEOGRAPHY FOR CLASS XII

© NCERT not to be republished

12099

राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्
NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

Reprint 2026-27

12099 – INDIA PEOPLE AND ECONOMY
Textbook for Class XII

ISBN 81-7450-734-5

First Edition
February 2007 Magha 1928

Reprinted
December 2007, January 2009 ,
January 2010, November 2010
March 2012, March 2013
November 2013, January 2015
January 2016, February 2017
February 2018, February 2019
January 2020, February 2021
November 2021

Revised Edition
November 2022 Agrahayana 1944

Reprinted
March 2024 Chaitra 1946
June 2024 Jyeshtha 1946
January 2025 Magha 1946
December 2025 Agrahayana 1947

PD 70T HK

© National Council of Educational Research and Training, 2007, 2022

₹ 90.00

Printed on 80 GSM paper with NCERT watermark

Published at the Publication Division by the Secretary, National Council of Educational Research and Training, Sri Aurobindo Marg, New Delhi 110 016 and printed at India Binding House, A-98, Sector-65, Noida 201 301

ALL RIGHTS RESERVED

- No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the prior permission of the publisher.
- This book is sold subject to the condition that it shall not, by way of trade, be lent, re-sold, hired out or otherwise disposed of without the publisher's consent, in any form of binding or cover other than that in which it is published.
- The correct price of this publication is the price printed on this page, Any revised price indicated by a rubber stamp or by a sticker or by any other means is incorrect and should be unacceptable.

OFFICES OF THE PUBLICATION DIVISION, NCERT

NCERT Campus
Sri Aurobindo Marg
New Delhi 110 016 **Phone : 011-26562708**

108, 100 Feet Road
Hosdakere Halli Extension
Banashankari III Stage
Bengaluru 560 085 **Phone : 080-26725740**

Navjivan Trust Building
P.O.Navjivan
Ahmedabad 380 014 **Phone : 079-27541446**

CWC Campus
Opp. Dhankal Bus Stop
Panihati
Kolkata 700 114 **Phone : 033-25530454**

CWC Complex
Maligaon
Guwahati 781 021 **Phone : 0361-2674869**

Publication Team

Head, Publication Division	:	*M.V. Srinivasan*
Chief Editor	:	*Bijnan Sutar*
Chief Business Manager	:	*Amitabh Kumar*
Chief Production Officer (In charge)	:	*Deepak Jaiswal*
Editor	:	*M. G. Bhagat*
Assistant Production Officer	:	*Deepak Kumar*

Cover and Illustrations
Blue Fish

Layout
Joel Gill

Cartography
Cartographic Design Agency

© NCERT not to be republished

Foreword

The National Curriculum Framework (NCF), 2005, recommends that children's life at school must be linked to their life outside the school. This principle marks a departure from the legacy of bookish learning which continues to shape our system and causes a gap between the school, home and community. The syllabi and textbooks developed on the basis of NCF signify an attempt to implement this basic idea. They also attempt to discourage rote learning and the maintenance of sharp boundaries between different subject areas. We hope these measures will take us significantly further in the direction of a child-centred system of education outlined in the National Policy on Education (1986).

The success of this effort depends on the steps that school principals and teachers will take to encourage children to reflect on their own learning and to pursue imaginative activities and questions. We must recognise that, given space, time and freedom, children generate new knowledge by engaging with the information passed on to them by adults. Treating the prescribed textbook as the sole basis of examination is one of the key reasons why other resources and sites of learning are ignored. Inculcating creativity and initiative is possible if we perceive and treat children as participants in learning, not as receivers of a fixed body of knowledge.

These aims imply considerable change in school routines and mode of functioning. Flexibility in the daily time-table is as necessary as rigour in implementing the annual calendar so that the required number of teaching days are actually devoted to teaching. The methods used for teaching and evaluation will also determine how effective this textbook proves for making children's life at school a happy experience, rather than a source of stress or boredom. Syllabus designers have tried to address the problem of curricular burden by restructuring and reorienting knowledge at different stages with greater consideration for child psychology and the time available for teaching. The textbook attempts to enhance this endeavour by giving higher priority and space to opportunities for contemplation and wondering, discussion in small groups, and activities requiring hands-on experience.

The National Council of Educational Research and Training (NCERT) appreciates the hard work done by the textbook development committee responsible for this book. We wish to thank the Chairperson of the advisory committee for textbooks in Social Sciences, at the higher secondary level, Professor Hari Vasudevan and the Chief Advisor for this book, Professor M.H. Qureshi for guiding the work of this committee. Several teachers contributed to the development of this textbook; we are grateful to their principals for making this possible. We are indebted to the institutions and organisations which have generously permitted us to draw upon their resources, material and personnel. We are especially grateful to the members of the National Monitoring Committee, appointed by the Department of Secondary and Higher Education, Ministry of Human Resource Development under the Chairpersonship of Professor Mrinal Miri and Professor G.P. Deshpande, for their valuable time and contribution. As an organisation committed to systemic reform and continuous improvement in the quality of its products, NCERT welcomes comments and suggestions which will enable us to undertake further revision and refinement.

Director
National Council of Educational
Research and Training

New Delhi
20 November 2006

© NCERT not to be republished

THE CONSTITUTION OF INDIA

PREAMBLE

WE, THE PEOPLE OF INDIA, having solemnly resolved to constitute India into a [1]**[SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC]** and to secure to all its citizens :

JUSTICE, social, economic and political;

LIBERTY of thought, expression, belief, faith and worship;

EQUALITY of status and of opportunity; and to promote among them all

FRATERNITY assuring the dignity of the individual and the [2][unity and integrity of the Nation];

IN OUR CONSTITUENT ASSEMBLY this twenty-sixth day of November, 1949 do **HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.**

---

1. Subs. by the Constitution (Forty-second Amendment) Act, 1976, Sec.2, for "Sovereign Democratic Republic" (w.e.f. 3.1.1977)
2. Subs. by the Constitution (Forty-second Amendment) Act, 1976, Sec.2, for "Unity of the Nation" (w.e.f. 3.1.1977)

Rationalisation of Content in the Textbooks

In view of the COVID-19 pandemic, it is imperative to reduce content load on students. The National Education Policy 2020, also emphasises reducing the content load and providing opportunities for experiential learning with creative mindset. In this background, the NCERT has undertaken the exercise to rationalise the textbooks across all classes. Learning Outcomes already developed by the NCERT across classes have been taken into consideration in this exercise.

Contents of the textbooks have been rationalised in view of the following:

- Overlapping with similar content included in other subject areas in the same class
- Similar content included in the lower or higher class in the same subject
- Difficulty level
- Content, which is easily accessible to students without much interventions from teachers and can be learned by children through self-learning or peer-learning
- Content, which is irrelevant in the present context

This present edition, is a reformatted version after carrying out the changes given above.

© NCERT not to be republished

© NCERT
not to be republished

Textbook Development Committee

Chairperson, Advisory Committee for Textbooks in Social Sciences at the Higher Secondary Level

Hari Vasudevan, *Professor,* Department of History, University of Calcutta, Kolkata

Chief Advisor

M. H. Qureshi, *Professor,* Centre for the Study of Regional Development, Jawaharlal Nehru University, New Delhi

Members

Abdul Shaban, *Assistant Professor*, Centre for Development Studies, Tata Institute of Social Sciences, Deonar, Mumbai

Archana K. Roy, *Lecturer*, Department of Geography, B.H.U., Varanasi

B. S. Butola, *Professor,* Centre for the Study of Regional Development, Jawaharlal Nehru University, New Delhi

Beena Srikumar, *PGT*, CRPF Public School, Rohini, New Delhi

G. Parimala, *Dean*, College Development Council, University of Madras, Chennai

M.S. Jaglan, *Reader*, Department of Geography, Kurukshetra University, Kurukshetra

P.K. Malik, *Lecturer*, Government College, Bahadurgarh, Jhajjar

Sucharita Sen, *Associate Professor,* Centre for the Study of Regional Development, Jawaharlal Nehru University, New Delhi

Sudeshna Bhattacharya, *Reader*, Department of Geography, Miranda House, University of Delhi, Delhi

Sutapa Sengupta, *Lecturer (Selection Grade)*, Department of Geography, St. Mary's College, Shillong

Member-Coordinator

Aparna Pandey, *Lecturer*, Department of Education in Social Sciences and Humanities, NCERT, New Delhi

© NCERT not to be republished

Acknowledgements

The National Council of Educational Research and Training acknowledges the contribution of Kalpana Markandeya, *Professor,* Department of Geography, Osmania University, Hyderabad, and Pervez Ahmed, *Lecturer*, P.G. Department of Geography and Regional Development, University of Kashmir, Kashmir in the development of this textbook.

Special thanks are due to Savita Sinha, *Professor* and *Head*, Department of Education in Social Sciences and Humanities, for her valuable support at every stage of preparation of this textbook.

The Council is thankful to the Survey of India for certification of maps given in the textbook. It also gratefully acknowledges the support of individuals and organisations as listed below for providing various photographs, illustrations, cartoons and articles used in this textbook: Zaheen Alam, *Lecturer*, Dayal Singh College, New Delhi, for Fig.7.4; Swapnil Sakhare, Mumbai, for Fig. on page 100, 102; Centre for Dalit and Tribal Studies, TISS, Mumbai, for Fig. on page 102; Janhit Foundation, Meerut for Case Study on page 99; M.S. Jaglan, *Reader*, Kurukshetra University, for Fig. 6.1, 6.4, 6.5; R.K. Laxman (*The Times of India*) for cartoon on page 99; Shveta Uppal, NCERT, for Fig. 2.1, 2.2, 2.3, 3.10 and 7.7; Kalyan Banerjee, NCERT, for Figs. on page 15, 41; Directorate of Extension, Ministry of Agriculture I.A.R.I Campus, New Pusa, New Delhi, for Fig. 3.7, 3.8; The *Times of India*, New Delhi, for Fig. 3.2, 7.1 and for news items on page 12, 38, 63, 95, 96, 97, 99; *The Hindu* for Fig. 9.1 and for news items on page 63, 101; CCSHAU, Hisar, for Fig. 3.12; *The Economic Times*, New Delhi, for news items on page 57, 74, 82; *Hindustan*, New Delhi, for news items on page 38, 46, 63, 101; *Dainik Jagran*, Varanasi, for news item on page 38; Ministry of Mines, Government of India for Fig. 9.2 and a figure on page 53; Geological Survey of India for Fig. 5.4; ITDC/Ministry of Tourism, Government of India for Fig. 7.8; National Disaster Management Division, Ministry of Home Affairs, Government of India for a figure on page 48; *Today* for Fig.7.2; *Competition Success Review*, Year Book, 2006 for Fig. 7.5 and 7.6; Ministry of Shipping, Government of India for Fig. 8.3 and on page 86; *Down to Earth*, CSE, New Delhi for a figure on page 97. The Economic times for news items on page 38 energyworld.com for news item on page 63.

The Council also acknowledges the contributions of Ishwar Singh, *DTP Operator;* Ajay Singh, *Copy Editor;* and Dinesh Kumar, *Computer In-charge*, who have helped in giving final shape to this book. The contribution of the Publication Department, NCERT is also duly acknowledged.

The following are applicable to all the maps of India used in this textbook

1. © Government of India, Copyright 2006
2. The responsibility for the correctness of internal details rests with the publisher.
3. The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.
4. The administrative headquarters of Chandigarh, Haryana and Punjab are at Chandigarh.
5. The interstate boundaries amongst Arunachal Pradesh, Assam and Meghalaya shown on this map are as interpreted from the "North-Eastern Areas (Reorganisation) Act.1971," but have yet to be verified.
6. The external boundaries and coastlines of India agree with the Record/Master Copy certified by Survey of India.
7. The state boundaries between Uttaranchal & Uttar Pradesh, Bihar & Jharkhand and Chhattisgarh & Madhya Pradesh have not been verified by the Governments concerned.
8. The spellings of names in this map, have been taken from various sources.

© NCERT not to be republished

Contents

	Foreword	*iii*
	Rationalisation of Content in the Textbooks	*v*
	Unit I	
1.	Population : Distribution, Density, Growth and Composition	1-14
	Unit II	
2.	Human Settlements	15-20
	Unit III	
3.	Land Resources and Agriculture	21-40
4.	Water Resources	41-52
5.	Mineral and Energy Resources	53-65
6.	Planning and Sustainable Development in Indian Context	66-74
	Unit IV	
7.	Transport and Communication	75-85
8.	International Trade	86-94
	Unit V	
9.	Geographical Perspective on Selected Issues and Problems	95-105
	Appendices	106-114
	Glossary	115
	References	116-117

© NCERT not to be republished

School Bhuvan–NCERT an Online web portal

Web based online e-learning Geo spatial portal **School Bhuvan–NCERT** (URL: http://bhuvan.nrsc.gov.in/governance/mhrd_ncert/) has been launched by NCERT and ISRO in collaboration to enhance geo spatial skills among students. This online e-learning portal includes thematic maps given in Geography textbooks. This portal enables students to use Geo-spatial technology for better understanding of concepts in Geography. Online activities available on the portal as Level 1, Level 2 and Level 3 encourage learners from Classes VI to XII to develop neighbourhood maps and their attributes on satellite imageries available on **School Bhuvan–NCERT**.

© NCERT not to be republished

Appendix (i)

India: State-wise Population Distribution, Density and Growth, 2011

State/UT Code	India/State/ Union Territory #	Total Population Persons	National Share (%)	Density	Decadal growth rate 2001-11
	India	**1210193422**	**100**	**382**	**17.64**
01	Jammu & Kashmir	12,548,926	1.04	124	23.71
02	Himachal Pradesh	6,856,509	0.57	123	12.81
03	Punjab	27,704,236	2.29	550	13.73
04	Chandigarh #	1,054,686	0.09	9,252	17.10
05	Uttarakhand	10,116,752	0.84	189	19.17
06	Haryana	25,353,081	2.09	573	19.90
07	NCT of Delhi #	16,753,235	1.38	11,297	20.96
08	Rajasthan	68,621,012	5.67	201	21.44
09	Uttar Pradesh	199,581,477	16.49	828	20.09
10	Bihar	103,804,637	8.58	1,102	25.07
11	Sikkim	607,688	0.05	86	12.36
12	Arunachal Pradesh	1,382,611	0.11	17	25.92
13	Nagaland	1,980,602	0.16	119	-0.47
14	Manipur	2,721,756	0.22	122	18.65
15	Mizoram	1,091,014	0.09	52	22.78
16	Tripura	3,671,032	0.30	350	14.75
17	Meghalaya	2,964,007	0.24	132	27.82
18	Assam	31,169,272	2.58	397	16.93
19	West Bengal	91,347,736	7.55	1,029	13.93
20	Jharkhand	32,966,238	2.72	414	22.34
21	Orissa	41,947,358	3.47	269	13.97
22	Chhattisgarh	25,540,196	2.11	189	22.59
23	Madhya Pradesh	72,597,565	6.00	236	20.30
24	Gujarat	60,383,628	4.99	308	19.17
25	Daman & Diu #	242,911	0.02	2,169	53.54
26	Dadra & Nagar Haveli #	342,853	0.03	698	55.50
27	Maharashtra	112,372,972	9.29	365	15.99
28	Andhra Pradesh	84,665,533	7.00	308	11.10
29	Karnataka	61,130,704	5.05	319	15.67
30	Goa	1,457,723	0.12	394	8.17
31	Lakshadweep #	64,429	0.01	2,013	6.23
32	Kerala	33,387,677	2.76	859	4.86
33	Tamil Nadu	72,138,958	5.96	555	15.60
34	Puducherry #	1,244,464	0.10	2598	27.72
35	Andaman & Nicobar Islands #	379,944	0.03	46	6.68

Source : Census of India, 2011

© NCERT not to be republished

Appendix (ii)

India : Decadel Birth Rate, Death Rate and Rate of Natural Increase, 1901 – 2011

Decades	Crude Birth Rate Per 1000	Crude Death Rate Per 1000	Rate of Natural Increase (Per 1000)
1901 - 1911	49.2	42.6	6.6
1911 - 1921	48.1	47.2	0.9
1921 - 1931	46.4	36.2	10.2
1931 - 1941	45.9	37.2	8.7
1941 - 1951	39.9	27.4	12.5
1951 - 1961	41.7	22.8	18.9
1961 - 1971	41.1	19.0	22.1
1971 - 1981	37.2	15	22.2
1981 - 1991	29.5	9.8	19.7
1991 - 2001	25.4	8.4	17.0
2001 - 2011	21.8	7.1	14.7

** Source: Sample Registration System (SRS) Bulletin, October 2012*

© NCERT not to be republished

Appendix (iii)
India: Rural and Urban Population 2011

State/UT Code	India/State/ Union Territory	Population		Percentage of Urban Population
		Rural	Urban	
	India	**833087662**	**377,105,760**	**31.16**
01	Jammu & Kashmir	9,134,820	3,414,106	27.21
02	Himachal Pradesh	6,167,805	688,704	10.04
03	Punjab	17,316,800	10,387,436	37.49
04	Chandigarh	29,004	1,025,682	97.25
05	Uttarakhand	7,025,583	3,091,169	30.55
06	Haryana	16,531,493	8,821,588	34.79
07	NCT of Delhi	419,319	16,333,916	97.50
08	Rajasthan	51,540,236	17,080,776	24.89
09	Uttar Pradesh	155,111,022	44,470,455	22.28
10	Bihar	92,075,028	11,729,609	11.30
11	Sikkim	455,962	151,726	24.97
12	Arunachal Pradesh	1,069,165	313,446	22.67
13	Nagaland	1,406,861	573,741	28.97
14	Manipur	1,899,624	822,132	30.21
15	Mizoram	529,037	561,977	51.51
16	Tripura	2,710,051	960,981	26.18
17	Meghalaya	2,368,971	595,036	20.08
18	Assam	26,780,516	4,388,756	14.08
19	West Bengal	62,213,676	29,134,060	31.89
20	Jharkhand	25,036,946	7,929,292	24.05
21	Orissa	34,951,234	6,996,124	16.68
22	Chhattisgarh	19,603,658	5,936,538	23.24
23	Madhya Pradesh	52,537,899	20,059,666	27.63
24	Gujarat	34,670,817	25,712,811	42.58
25	Daman & Diu	60,331	182,580	75.16
26	Dadra & Nagar Haveli	183,024	159,829	46.62
27	Maharashtra	61,545,441	50,827,531	45.23
28	Andhra Pradesh	56,311,788	28,353,745	33.49
29	Karnataka	37,552,529	23,578,175	38.57
30	Goa	551,414	906,309	62.17
31	Lakshadweep	14,121	50,308	78.08
32	Kerala	17,455,506	15,932,171	47.72
33	Tamil Nadu	37,189,229	34,949,729	48.45
34	Puducherry	394,341	850,123	68.31
35	Andaman & Nicobar Islands	244,411	135,533	35.67

© NCERT not to be republished

Appendix (iv)

India : % of Population of Religious Groups 2011

States/ Union Territories	Hindus	Muslims	Christians	Sikhs	Buddhists	Jains	Other Relgions	Religions not stated
Jammu & Kashmir	28.44	68.31	0.28	1.87	0.90	0.02	0.01	0.16
Himachal Pradesh	95.17	2.18	0.18	1.16	1.15	0.03	0.01	0.12
Punjab	38.49	1.93	1.26	57.69	0.12	1.16	0.04	0.32
Chandigarh	80.78	4.87	0.83	13.11	0.11	0.19	0.02	0.10
Uttarakhand	82.97	13.95	0.37	2.34	0.15	0.09	0.01	0.12
Haryana	87.46	7.03	0.20	4.91	0.03	0.21	0.01	0.17
Delhi	81.68	12.86	0.87	3.40	0.11	0.99	0.01	0.08
Rajasthan	88.49	9.07	0.14	1.27	0.02	0.91	0.01	0.10
Uttar Pradesh	79.73	19.26	0.18	0.32	0.10	0.11	0.01	0.29
Bihar	82.69	16.87	0.12	0.02	0.02	0.02	0.01	0.24
Sikkim	57.76	1.62	9.91	0.31	27.39	0.05	2.67	0.30
Arunachal Pradesh	29.04	1.95	30.26	0.24	11.77	0.06	26.20	0.48
Nagaland	8.75	2.47	87.93	0.10	0.34	0.13	0.16	0.12
Manipur	41.39	8.40	41.29	0.05	0.25	0.06	8.19	0.38
Mizoram	2.75	1.35	87.16	0.03	8.51	0.03	0.07	0.09
Tripura	83.40	8.60	4.32	0.03	3.41	0.02	0.04	0.14
Meghalaya	11.53	4.40	74.59	0.10	0.33	0.02	8.71	0.32
Assam	61.47	34.22	3.74	0.07	0.18	0.08	0.09	0.16
West Bengal	70.54	27.01	0.72	0.07	0.31	0.07	1.03	0.25
Jharkhand	67.83	14.53	4.30	0.22	0.03	0.05	12.84	0.21
Orissa	93.63	2.17	2.77	0.05	0.03	0.02	1.14	0.18
Chhattisgarh	93.25	2.02	1.92	0.27	0.28	0.24	1.94	0.09
Madhya Pradesh	90.89	6.57	0.29	0.21	0.30	0.78	0.83	0.13
Gujarat	88.57	9.67	0.52	0.10	0.05	0.96	0.03	0.10
Daman & Diu	90.50	7.92	1.16	0.07	0.09	0.21	0.03	0.10
Dadra & Nagar Haveli	93.93	3.76	1.49	0.06	0.18	0.35	0.09	0.14
Maharashtra	79.83	11.54	0.96	0.20	5.81	1.25	0.16	0.25
Andhra Pradesh	88.46	9.56	1.34	0.05	0.04	0.06	0.01	0.48
Karnataka	84.00	12.92	1.87	0.05	0.16	0.72	0.2	0.27
Goa	66.08	8.33	25.10	0.10	0.08	0.08	0.02	0.21
Lakshadweep	2.77	96.58	0.49	0.01	0.02	0.02	0.01	0.10
Kerala	54.73	26.56	18.38	0.01	0.01	0.01	0.02	0.26
Tamil Nadu	87.58	5.86	6.12	0.02	0.02	0.12	0.01	0.26
Puducherry	87.30	6.05	6.29	0.02	0.04	0.11	0.01	0.17
Andaman & Nicobar Islands	69.45	8.52	21.28	0.34	0.09	0.01	0.15	0.18

Source : Census of India, 2011

© NCERT not to be republished

Appendix (v)

India: Work Participation Rate and Occupation Structure, 2011

States/UTs	Work Participation Rate (%)	Cultivators	% to Total Workers	Agricultural Labourers	% to Total Workers	Household Industries	% to Total Workers	Other Workers	% to Total Workers
INDIA	**39.8**	**11,86,92,640**	**24.6**	**14,43,29,833**	**30**	**1,83,36,307**	**3.8**	**20,03,84.531**	**41.6**
Jammu & Kashmir	34.5	12,45,316	28.8	5,47,705	12.7	1,72,586	4	23,57,106	54.5
Himachal Pradesh	51.9	20,62,062	57.9	1,75,038	4.9	58,719	1.6	12,63,603	35.5
Punjab	35.7	19,34,511	19.5	15,88,455	16	3,85,960	3.9	59,88,436	60.5
Chandigarh	38.3	2,578	0.6	1,687	0.4	4,799	1.2	3,95,072	97.8
Uttarakhand	38.4	15,80,423	40.8	4,03,301	10.4	1,14,312	3	17,74,239	45.8
Haryana	35.2	24,80,801	27.8	15,28,133	17.1	2,62,280	2.9	46,45,294	52.1
NCT of Delhi	33.3	33,398	0.6	39,475	0.7	1,81,852	3.3	53,32,324	95.4
Rajasthan	43.6	1,36,18,870	45.6	49,39,664	16.5	7,20,573	2.4	1,06,07,148	35.5
Uttar Pradesh	32.9	1,90,57,888	29	1,99,39,223	30.3	38,98,590	5.9	2,29,19,014	34.8
Bihar	33.4	71,96,226	20.7	1,83,45,649	52.8	14,11,208	4.1	77,71,904	22.4
Sikkim	50.5	1,17,401	38.1	25,986	8.4	5,143	1.7	1,59,608	51.8
Arunachal Pradesh	42.5	3,02,723	51.5	36,171	6.2	8,365	1.4	2,40,398	40.9
Nagaland	49.2	5,37,702	55.2	62,962	6.5	22,838	2.3	3,50,620	36
Manipur	45.1	4,57,891	39.5	1,11,061	9.6	89,495	7.7	5,00,606	43.2
Mizoram	44.4	2,29,603	47.2	41,787	8.6	7,852	1.6	2,07,463	42.6
Tripura	40	2,95,947	20.1	3,53,618	24.1	41,496	2.8	7,78,460	53
Meghalaya	40	4,94,675	41.7	1,98,364	16.7	20,488	1.7	4,72,092	39.8
Assam	38.4	40,61,627	33.9	18,45,346	15.4	4,91,321	4.1	55,71,396	46.5
West Bengal	38.1	51,16,668	14.7	1,01,88,842	29.3	24,64,124	7.1	1,69,86,701	48.9
Jharkhand	39.7	38,14,832	29.1	44,36,052	33.9	4,55,162	3.5	43,92,228	33.5
Orissa	41.8	41,03,989	23.4	67,39,993	38.4	7,83,080	4.5	59,14,527	33.7
Chhattisgarh	47.7	40,04,796	32.9	50,91,882	41.8	1,87,631	1.5	28,95,916	23.8
Madhya Pradesh	43.5	89,44,439	31.2	1,21,92,267	38.6	9,59,259	3	85,78,168	27.2
Gujarat	41	54,47,500	22	68,39,415	27.6	3,43,999	1.4	1,21,36,833	49
Daman & Diu	49.9	2,316	1.9	772	0.6	684	0.6	1,17,499	96.9
D & N Haveli	45.7	28,164	17.9	17,799	11.3	2,195	1.4	1,09,003	69.4
Maharashtra	44	1,25,69,373	25.4	1,34,86,140	27.3	12,25,426	2.5	2,21,46,939	44.8
Andhra Pradesh	46.6	64,91,522	16.5	1,69,67,754	43	14,39,137	3.7	1,45,24,493	36.8
Karnataka	45.6	65,80,649	23.6	71,55,963	25.7	9,13,227	3.3	1,32,22,758	47.4
Goa	39.6	31,354	5.4	26,760	4.6	14,708	2.5	5,04,426	87.4
Lakshadweep	29.1	0	0	0	0	264	1.4	18,489	98.6
Kerala	34.8	6,70,253	5.8	13,22,850	11.4	2,73,022	2.3	93,52,938	80.5
Tamil Nadu	45.6	42,48,457	12.9	96,06,547	29.2	13,64,893	4.2	1,76,64,784	53.7
Puducherry	35.7	12,099	2.7	68,391	15.4	7,892	1.8	3,56,586	80.1
A & N Islands	40.1	16,567	10.9	4,781	3.1	3,727	2.4	1,27,460	83.6

Source : Census of India, 2011

© NCERT not to be republished

Appendix (vi)

Table 1: Land Use Categories in India 2019–20

Land Use Classes	1950–51 (Million Hectare)	Per cent	2019–20 (Million Hectare)	Per cent
Reporting Area	**284.32**	**100**	**306.5**	**100**
Forests	40.48	17.0	71.75	23.4
Area under non-agricultural use	9.36	3.2	27.77	9.0
Barren and unculturable waste Land	38.16	13.4	16.54	5.4
Permanent Pasturer and Grazing Land	6.68	2.3	10.48	3.4
Area under Misc. Tree crops and Groves	19.83	6.9	3.13	1.0
Culturable Waste Land	22.94	8.0	11.95	3.9
Fallow other than Current Fallow	17.45	6.1	11.24	3.7
Current Fallow	10.68	3.7	13.77	4.5
Net Area Sown	118.75	41.7	139.90	45.6

Source : Land use statistics 2023. Directorate of Economics & Statistics, DAC & FW.

Table 2: India's position in World Agriculture

S. No.	Crop	% Share in World Production and rank (2018)
1	Rice	22.07 (Second)
2	Wheat	13.58 (Second)
I	**Total Cereals**	**10.74 (Third)**
II	**All Pulses**	**27.63 (First)**
8	Groundnut	18.18 (Second)
9	Rape seed	11.24 (Third)
10	Jute	53.72 (First)
11	Sugarcane	19.76 (Second)
12	Tea	21.22 (Second)
13	Coffee	3.17 (Eight)

Source: FAOSTAT (as on 23.12.2020), Pocket Book of Agriculture Statistics, 2020.

© NCERT not to be republished

Table 3 : Three Largest Producing States of major crops during 2019-20

Production - Million Tonnes

Group of Crops	Crops	States	Production*
(1)	(2)	(3)	(4)
1. Foodgrains			
	Rice	West Bengal	15.57
		Uttar Pradesh	15.52
		Punjab	11.78
		All India	**118.43**
	Wheat	Uttar Pradesh	32.59
		Madhya Pradesh	19.61
		Punjab	17.57
		All India	**107.59**
	Maize	Karnataka	3.96
		Madhya Pradesh	3.91
		Telangana	3.00
		All India	**28.64**
	Total Nutri/Coarse Cereals	Rajasthan	7.29
		Karnataka	6.45
		Madhya Pradesh	4.82
		All India	**47.48**
	Total Pulses	Rajasthan	4.49
		Maharashtra	4.03
		Madhya Pradesh	3.80
		All India	**23.15**
	Total Foodgrains	Uttar Pradesh	55.03
		Madhya Pradesh	33.03
		Punjab	30.02
		All India	**296.65**
II. Oilseeds			
	Groundnut	Gujarat	4.64
		Rajasthan	1.62
		Tamilnadu	0.98
		All India	**10.10**
	Rapesseed & Mustard	Rajasthan	4.22
		Haryana	1.15
		Uttar Pradesh	0.96
		All India	**9.12**
	Soyabean	Madhya Pradesh	5.15
		Maharashtra	4.60
		Rajasthan	0.52
		All India	**11.22**
	Sunflower	Karnataka	0.12
		Odisha	0.03
		Bihar	0.01
		All India	**0.22**

© NCERT not to be republished

Table 3 : *(Contd.)*

Production - Million Tonnes

Group of Crops	Crops	States	Production
(1)	(2)	(3)	(4)
	Total Oilseeds	Rajasthan	6.79
		Gujarat	6.66
		Madhya Pradesh	6.57
		All India	**33.42**
III. Other Cash Crops			
	Sugarcane	Uttar Pradesh	178.42
		Maharashtra	64.67
		Karnataka	31.60
		All India	**355.70**
	Cotton@	Gujarat	8.28
		Telangana	6.83
		Maharashtra	6.782
		All India	**35.491**
	Jute & Mesta$	West Bengal	8.0572
		Bihar	0.86
		Assam	0.77
		All India	**9.91**

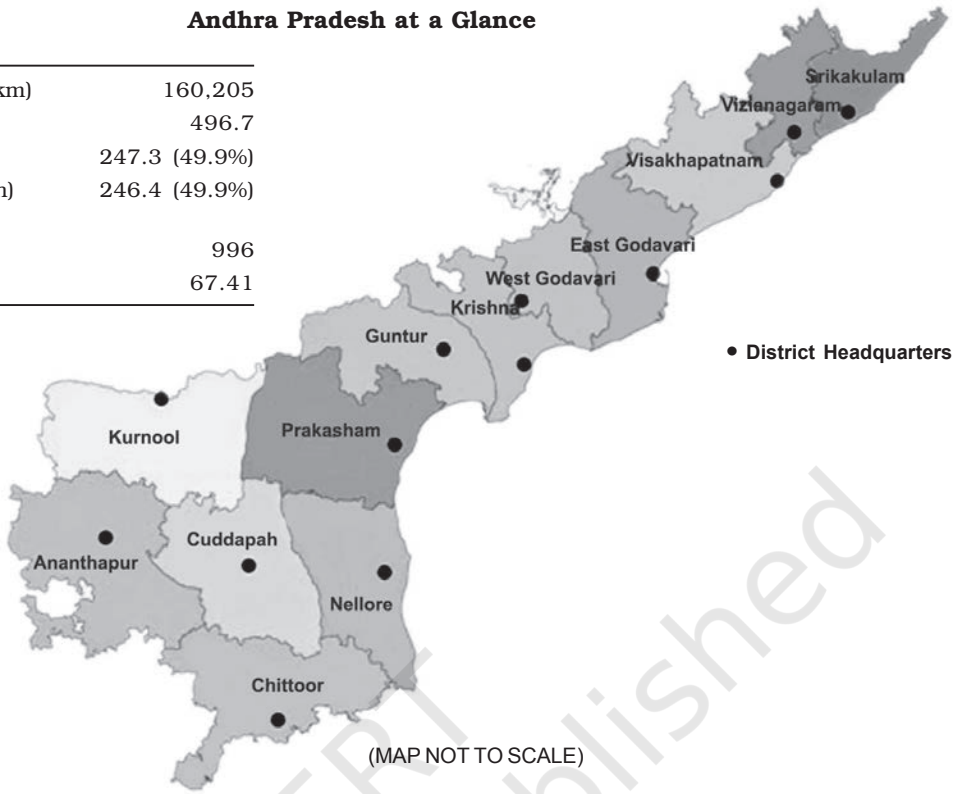
Source : Directorate of Economics and Statistics, Pocket Book of Agricultural Statistics, 2020.
** Production Estimates are as per 4th Advance Estimates.*
@ : Production in million bales of 170 kg each.
$: Production in million bales of 180 kg each.

© NCERT not to be republished

Andhra Pradesh at a Glance

Geographical Area (Sq. km)	160,205
Total Population (Lakh)	496.7
Male Population (Lakh)	247.3 (49.9%)
Female Population (Lakh)	246.4 (49.9%)
Sex Ratio (Females per 1000 males)	996
Literacy Rate (%)	67.41

Source: www.ap.gov.in/AP

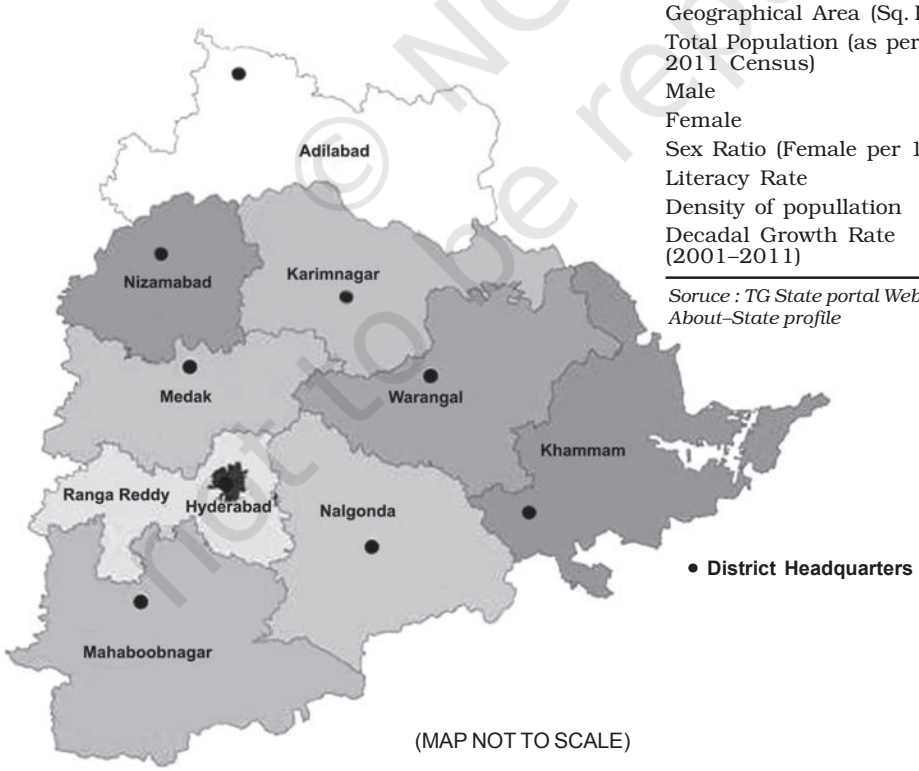


(MAP NOT TO SCALE)

Telangana at a Glance

Geographical Area (Sq. Km.)	112077
Total Population (as per 2011 Census)	350.04 Lakh
Male	176.12 Lakh
Female	173.92 Lakh
Sex Ratio (Female per 1000 Males)	988 Ratio
Literacy Rate	66.54%
Density of popullation	312/sq.km
Decadal Growth Rate (2001–2011)	13.58

Soruce : TG State portal Website: http://www.telangana.gov.in/About–State profile



(MAP NOT TO SCALE)

© NCERT not to be republished

REFERENCES

Alagh, Y. K. 1990. Agro-Climatic Planning and Regional Development, *Indian Journal of Agricultural Economics*, 45(3): 244-268.

Ashis Nandi (1998): Science, Hegemony and Violence: A Requiem for Modernity, *Oxford University Press*, Oxford.

Baker, Susan 2006. Sustainable Development, *Routledge*, London.

Bhalla, G. S. (ed.) 1994. Economic Liberalization and Indian Agriculture, *Institute for Studies in Industrial Development*, New Delhi

Chand, Mahesh and V. K. Puri, 1983. Regional Planning in India, *Allied Publishers Limited*, New Delhi.

Dantwala, M. L. and others 1986. Indian Agricultural Development Since Independence, *Indian Society of Agricultural Development*, New Delhi.

Elliot, Jennifer A 1994. An Introduction to Sustainable Development, *Routledge*, London.

Government of India. 1998. 'Water Statistics of India'. *Central Water Commission*, New Delhi.

Government of India. 1999. 'Integrated Water Resources Development – A Plan for Action'. *National Commission for Integrated Water Resources Development*, Ministry of Water Resources, New Delhi.

Government of India. 2002. 'National Water Policy 2002'. *Ministry of Water Resources*, New Delhi.

Government of India. 2002. Water Supply and Sanitation: A WHO – UNICEF Sponsored Study'. *Planning Commission*, New Delhi.

Ivan Illich (1981): The De-linking of Peace and Development, *Gandhi Marg*, pp.257-65.

Jaglan, M. S. 1990. Impact of Irrigation on Environmental and Socio-economic Conditions: A Case Study of Indira Gandhi Canal Command Area, unpublished thesis, CSRD, SSS, *Jawaharlal Nehru University*, New Delhi.

Jaglan, M. S. and M. H. Qureshi, 1996. Irrigation Development and Its Environmental Consequences in Arid Areas of India, *Environmental Management*, 20(3): 323-336.

Kumar, R, R. D. Singh and K. D. Sharma 2005. 'Water Resources of India', *Current Science*, 89(5), pp.794-811.

Kuper, A. and Jessica Kuper, 1989. The Social Science Encyclopedia, *Routledge Publishers*, New York.

Kurup, Raghava C. G. (ed.) 1966, Handbook of Agriculture, *Indian Council of Agricultural Research*, New Delhi.

Mahbub-ul-Haq (1993): Human Development in a Changing World, *United Nations Development Programme* (UNDP) Occasional Paper-4.

© NCERT not to be republished

Mishra, R. P. 1988.On the Concept of Region and Regional Planning, in Moonis Raza (ed.) Contribution to Indian Geography: Regional Development, *Heritage Publishers*, New Delhi.

Paul, Streeten (1984); Basic Needs: Some Unsettled Questions, *World Development*, Vol.12, No. 9, pp. 973-78.

Paul, Streeten (1995): Human Development: The Debate about the Index, *International Social Science Journal* No. 143, pp-25-37.

Planning Commission of India, Eighth Five Year Plan (1992-97), Vol. I, *Government of India*, New Delhi.

Soni, V. 2003. 'Water Carrying Capacity of a City: Delhi'. *Economic and Political Weekly*, November, 8, pp.4745-4749.

Sudhir Anand and Amartya K.Sen. 1994. Human Development Index: Methodology and Measurement, *Human Development Report Office*, Occasional Papers, pp.1-19.

Sudhir Anand and Martin Ravallion. 1993. Human Development in Poor Countries: On the Role of Private Incomes and Public Services, *Journal of Economic Perpectives*, Vol. 7, No. 1, pp.133-150.

Sundaram, K.V. 1986. Urban and Regional Planning in India, *Vikas Publishing House*, New Delhi.

Thakur, B. R. 2005. Socio-economic Transformation in Bharmaur Tribal Area of Himachal Pradesh since Inception of ITDP, unpublished PhD thesis, *Department of Geography, Kurukshetra University*, Kurukshetra

Tisdell, Clement A. 1990. Natural Resources, Growth and Development, *Prager Publishers*, New York.

UNDP. 1990-2003. Human Development Reports, *Oxford University Press*, Oxford.

Wilbanks, Thomas J. 1994. Sustainable Development in Geographic Perspective, *AAG*, 84 (4): 541-556.

World Commission on Environment and Development (WECD). 1987. Our Common Future, *Oxford University Press*, Oxford.

World Development Report. 1992. Development and Environment, *Oxford University Press*. Oxford.

© NCERT not to be republished

Notes

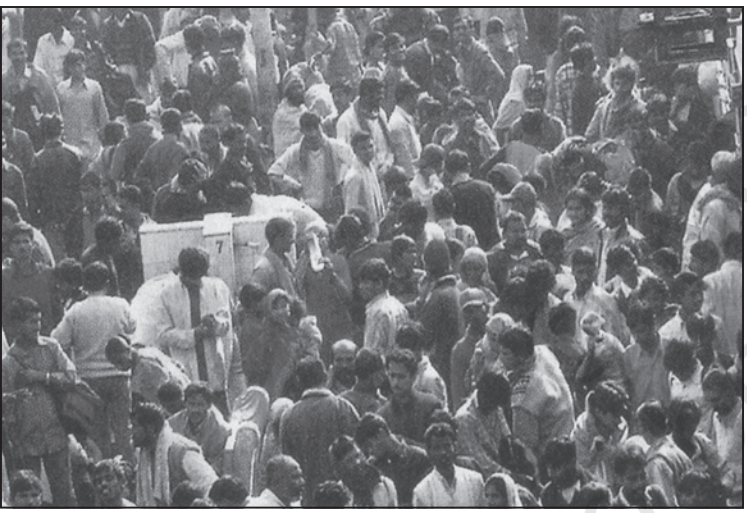
© NCERT
not to be republished

Unit I
Chapter 1

12099CH01

POPULATION

Distribution, Density, Growth and Composition



The people are very important component of a country. India is the second most populous country after China in the world with its total population of 1,210 million (2011). India's population is larger than the total population of North America, South America and Australia put together. More often, it is argued that such a large population invariably puts pressure on its limited resources and is also responsible for many socio-economic problems in the country.

How do you perceive the idea of India? Is it simply a territory? Does this signify an amalgam of people? Is it a territory inhabited by people living under certain institutions of governance?

In this chapter, we will discuss the patterns of distribution, density, growth and composition of India's population.

Sources of Population Data

Population data are collected through Census operation held every 10 years in our country. The first population Census in India was conducted in 1872 but its first complete Census was conducted only in 1881.

Distribution of Population

Examine Fig. 1.1 and try to describe the patterns of spatial distribution of population shown on it. It is clear that India has a highly uneven pattern of population distribution. The percentage shares of population of the states and Union Territories in the country (Appendix) show that Uttar Pradesh has the highest population followed by Maharashtra, Bihar and West Bengal.

Activity

Looking at the data in Appendix i, arrange the Indian States and Union Territories according to their sizes and population and find out :

© NCERT not to be republished

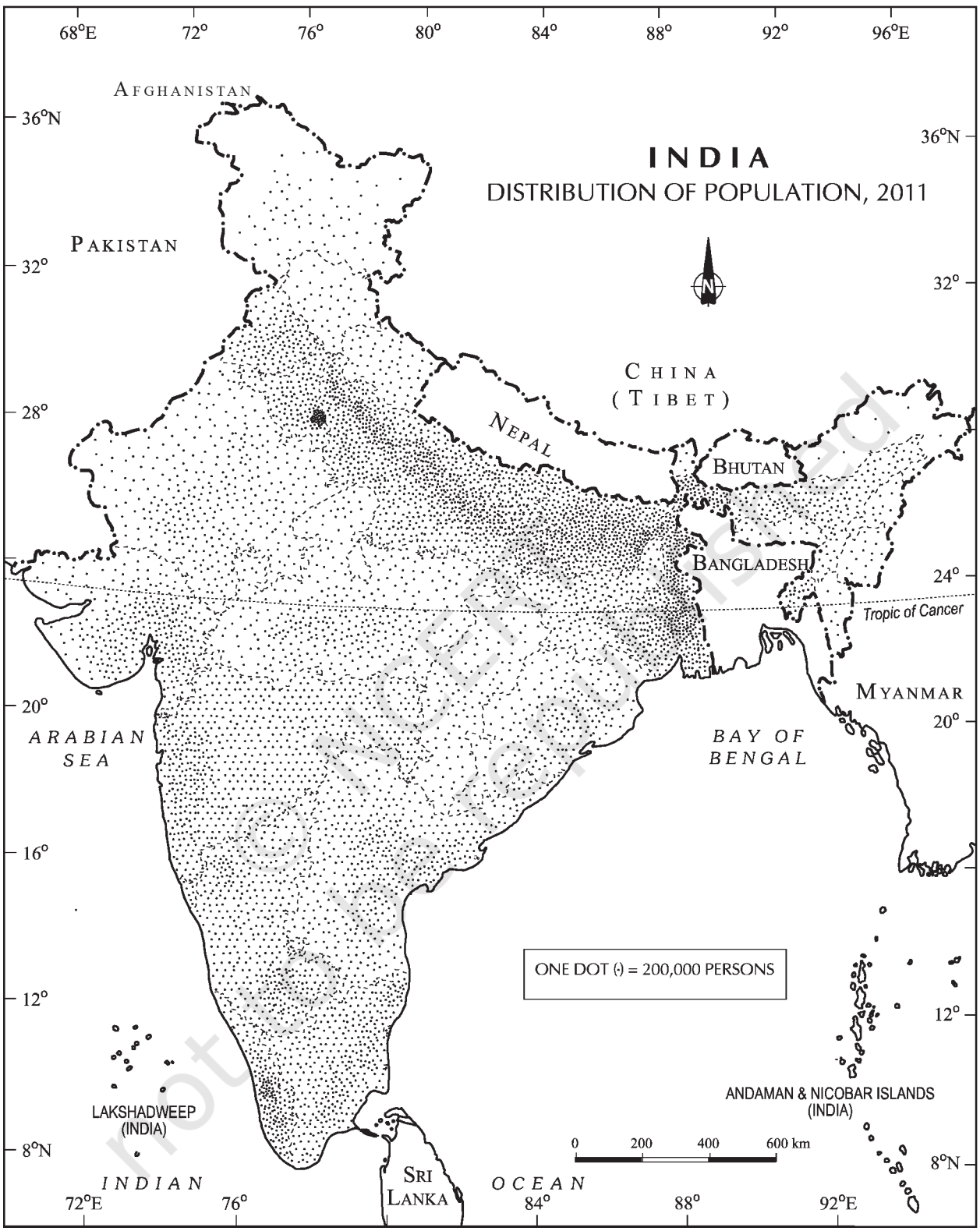


Fig. 1.1 : India – Distribution of Population

Reprint 2026-27

States/UTs of large size and large population

States/UTs of large size but small population

States/UTs of smaller size but larger population

Check from the table (Appendix–iA) that U.P., Maharashtra, Bihar, West Bengal, Andhra Pradesh along with Tamil Nadu, Madhya Pradesh, Rajasthan, Karnataka and Gujarat, together account for about 76 per cent of the total population of the country. On the other hand, share of population is very small in the states like Jammu & Kashmir (1.04%), Arunachal Pradesh (0.11%) and Uttarakhand (0.84%) inspite of theses states having fairly large geographical area.

Such an uneven spatial distribution of population in India suggests a close relationship between population and physical, socio-economic and historical factors. As far as the physical factors are concerned, it is clear that climate along with terrain and availability of water largely determines the pattern of the population distribution. Consequently, we observe that the North Indian Plains, deltas and Coastal Plains have higher proportion of population than the interior districts of southern and central Indian States, Himalayas, some of the north eastern and the western states. However, development of irrigation (Rajasthan), availability of mineral and energy resources (Jharkhand) and development of transport network (Peninsular States) have resulted in moderate to high concentration of population in areas which were previously very thinly populated.

Among the socio-economic and historical factors of distribution of population, important ones are evolution of settled agriculture and agricultural development; pattern of human settlement; development of transport network, industrialisation and urbanisation. It is observed that the regions falling in the river plains and coastal areas of India have remained the regions of larger population concentration. Even though the uses of natural resources like land and water in these regions have shown the sign of degradation, the concentration of population remains high because of an early history of human settlement and development of transport network. On the other hand, the urban regions of Delhi, Mumbai, Kolkata, Bengaluru, Pune, Ahmedabad, Chennai and Jaipur have high concentration of population due to industrial development and urbanisation drawing a large numbers of rural-urban migrants.

Density of Population

Density of population, is expressed as number of persons per unit area. It helps in getting a better understanding of the spatial distribution of population in relation to land. The density of population in India (2011) is 382 persons per sq km. There has been a steady increase of more than 200 persons per sq km over the last 50 years as the density of population increased from 117 persons/ sq km in 1951 to 382 persons/sq km in 2011.

The data shown in Appendix (i) give an idea of spatial variation of population densities in the country which ranges from as low as 17 persons per sq km in Arunachal Pradesh to 11,297 persons in the National Capital Territory of Delhi. Among the northern Indian States, Bihar (1102), West Bengal (1029) and and Uttar Pradesh (828) have higher densities, while Kerala (859) and Tamil Nadu (555) have higher densities among the peninsular Indian states. States like Assam, Gujarat, Andhra Pradesh, Haryana, Jharkhand, Odisha have moderate densities. The hill states of the Himalayan region and North eastern states of India (excluding Assam) have relatively low densities while the Union Territories (excluding Andaman and Nicobar islands) have very high densities of population (Appendix–i).

The density of population, as discussed in the earlier paragraph, is a crude measure of human and land relationship. To get a better insight into the human-land ratio in terms of pressure of population on total cultivable land, the *physiological* and the *agricultural* densities should be found out which are significant for a country like India having a large agricultural population.

© NCERT not to be republished

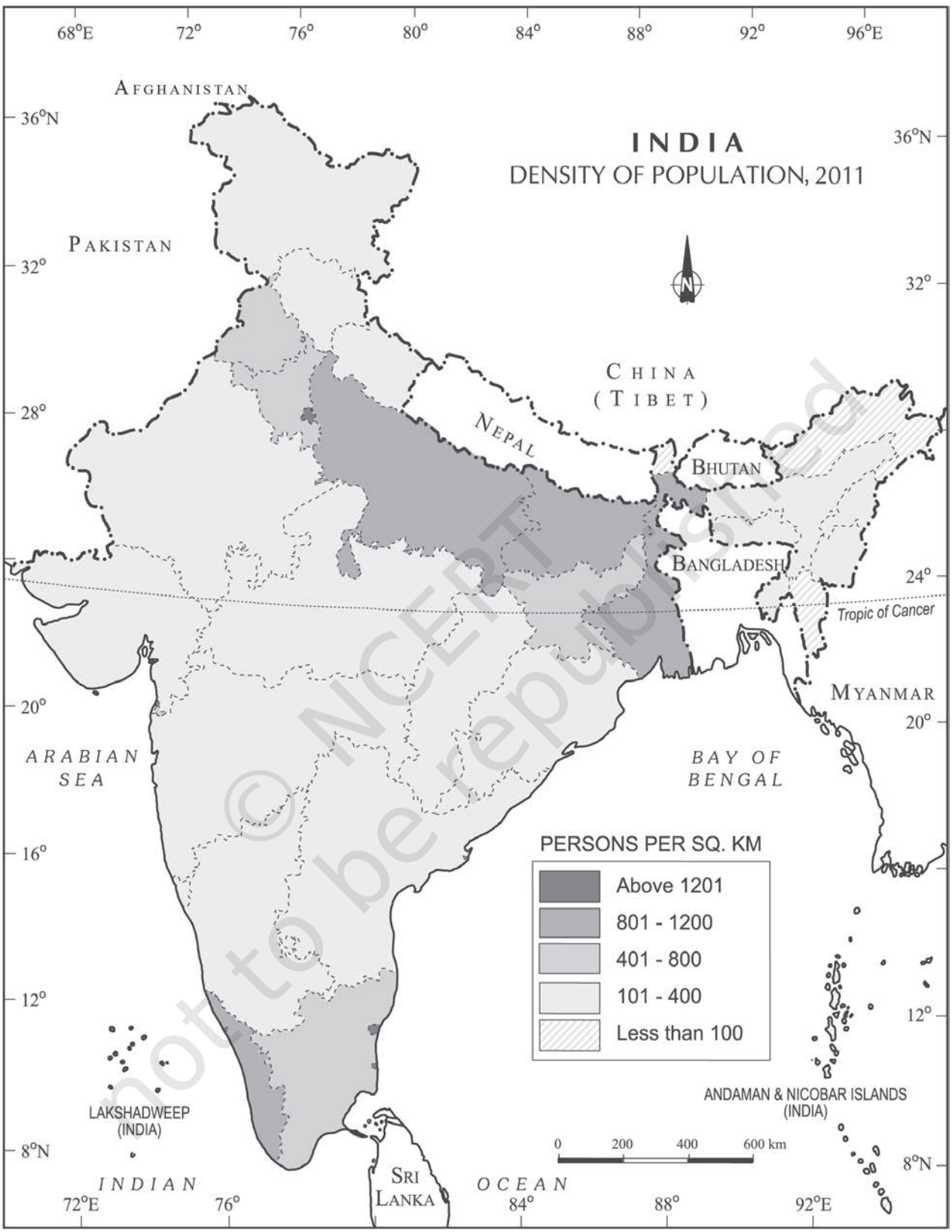


Fig. 1.2 : India – Density of Population

© NCERT not to be republished

Physiological density = total population / net cultivated area

Agricultural density = total agricultural population / net cultivable area

Agricultural population includes cultivators and agricultural labourers and their family members.

Growth of Population

Growth of population is the change in the number of people living in a particular area between two points of time. Its rate is expressed in percentage. Population growth has two components namely; natural and induced. While the natural growth is analysed by assessing the crude birth and death rates, the induced components are explained by the volume of inward and outward movement of people in any given area. However, in the present chapter, we will only discuss the natural growth of India's population.

The decadal and annual growth rates of population in India are both very high and steadily increasing over time. The annual growth rate of India's population is 1.64 per cent (2011).

Population Doubling Time

Population doubling time is the time taken by any population to double itself at its current annual growth rate.

The growth rate of population in India over the last one century has been caused by annual birth rate and death rate and rate of migration and thereby shows different trends. There are four distinct phases of growth identified within this period:

Table 1.1 : Decadal Growth Rates in India, 1901-2011

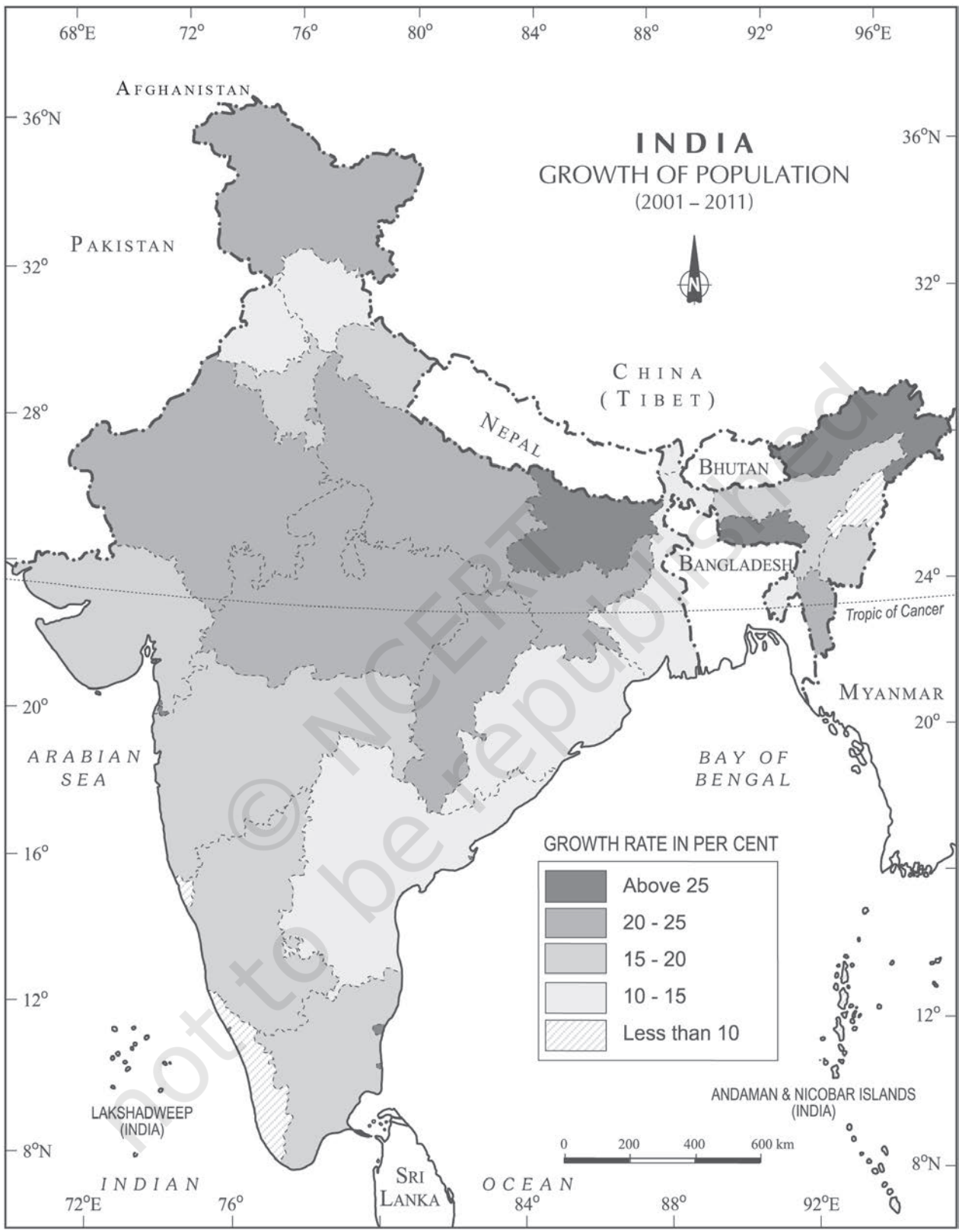
Census Years	Total Population	Growth Rate*	
		Absolute Number	% of Growth
1901	238396327	----------	----------
1911	252093390	(+) 13697063	(+) 5.75
1921	251321213	(–) 772117	(–) 0.31
1931	278977238	(+) 27656025	(+) 11.60
1941	318660580	(+) 39683342	(+) 14.22
1951	361088090	(+) 42420485	(+) 13.31
1961	439234771	(+) 77682873	(+) 21.51
1971	548159652	(+) 108924881	(+) 24.80
1981	683329097	(+) 135169445	(+) 24.66
1991	846302688	(+) 162973591	(+) 23.85
2001	1028610328	(+) 182307640	(+) 21.54
2011**	1210193422	(+) 181583094	(+) 17.64

* Decadal growth rate: $g = \frac{p_2 - p_1}{p_1} 100$

where p_1 = population of the base year
p_2 = population of the present year

** Source : Census of India, 2011(Provisional)

© NCERT not to be republished



© NCERT not to be republished

Fig. 1.3 : India – Growth of Population

Phase I : The period from 1901-1921 is referred to as a period of stagnant or stationary phase of growth of India's population, since in this period growth rate was very low, even recording a negative growth rate during 1911-1921. Both the birth rate and death rate were high keeping the rate of increase low (Appendix–iii). Poor health and medical services, illiteracy of people at large and inefficient distribution system of food and other basic necessities were largely responsible for a high birth and death rates in this period.

Phase II : The decades 1921-1951 are referred to as the period of steady population growth. An overall improvement in health and sanitation throughout the country brought down the mortality rate. At the same time better transport and communication system improved distribution system. The crude birth rate remained high in this period leading to higher growth rate than the previous phase. This is impressive at the backdrop of Great Economic Depression, 1920s and World War II.

Phase III : The decades 1951-1981 are referred to as the period of population explosion in India, which was caused by a rapid fall in the mortality rate but a high fertility rate of population in the country. The average annual growth rate was as high as 2.2 per cent. It is in this period, after the Independence, that developmental activities were introduced through a centralised planning process and economy started showing up ensuring the improvement of living condition of people at large. Consequently, there was a high natural increase and higher growth rate. Besides, increased international migration bringing in Tibetans, Bangladeshis, Nepalies and even people from Pakistan contributed to the high growth rate.

Phase IV : In the post 1981 till present, the growth rate of country's population though remained high, has started slowing down gradually (Table 1.1). A downward trend of crude birth rate is held responsible for such a population growth. This was, in turn, affected by an increase in the mean age at marriage, improved quality of life particularly education of females in the country.

The growth rate of population is, however, still high in the country, and it has been projected by World Development Report that population of India will touch 1,350 million by 2025.

The analysis done so far shows the average growth rate, but the country also has wide variation (Appendix–iv) in growth rates from one area to another which is discussed below.

Regional Variation in Population Growth

The growth rate of population during 1991-2001 in Indian States and Union Territories shows very obvious pattern.

The States like Kerala, Karnataka, Tamil Nadu, Andhra Pradesh, Odisha, Puducherry, and Goa show a low rate of growth not exceeding 20 per cent over the decade. Kerala registered the lowest growth rate (9.4) not only in this group of states but also in the country as a whole.

A continuous belt of states from west to east in the north-west, north, and north central parts of the country has relatively high growth rate than the southern states. It is in this belt comprising Gujarat, Maharashtra, Rajasthan, Punjab, Haryana, Uttar Pradesh, Uttarakhand, Madhya Pradesh, Sikkim, Assam, West Bengal, Bihar, Chhattisgarh, and Jharkhand, the growth rate on the average remained 20-25 per cent.

During 2001-2011, the growth rates of almost all States and Union Territories have registered a lower figure compared to the previous decade, namely, 1991-2001. The percentage decadal growth rates of the six most populous States, namely, Uttar Pradesh, Maharashtra, Bihar, West Bengal, Andhra

© NCERT not to be republished

Pradesh and Madhya Pradesh have all fallen during 2001-2011 compared to 1991-2001, the fall being the lowest for Andhra Pradesh (3.5% percentage points) and highest for Maharashtra (6.7 percentage points). Tamil Nadu (3.9 percentage points) and Puducherry (7.1 percentage points) have registered some increase during 2001-2011 over the previous decade.

Activity

Take the population growth data of the districts/selected districts of your respective state for total male and female population and represent them with the help of Composite Bar Graph.

An important aspect of population growth in India is the growth of its adolescents. At present the share of adolescents i.e., up to the age group of 10-19 years is about 20.9 per cent (2011), among which male adolescents constitute 52.7 per cent and female adolescents constitute 47.3 per cent. The adolescent population, though, regarded as the youthful population having high potentials, but at the same time they are quite vulnerable if not guided and channelised properly. There are many challenges for the society as far as these adolescents are concerned, some of which are lower age at marriage, illiteracy – particularly female illiteracy, school dropouts, low intake of nutrients, high rate of maternal mortality of adolescent mothers, high rate of HIV and AIDS infections, physical and mental disability or retardedness, drug abuse and alcoholism, juvenile delinquency and commitence of crimes, etc.

In view of these, the Government of India has undertaken certain policies to impart proper education to the adolescent groups so that their talents are better channelised and properly utilised. The National Youth Policy is one example which has been designed to look into the overall development of our large youth and adolescent population.

The National Youth Policy (NYP–2014) launched in February 2014 proposes a holistic 'vision' for the youth of India, which is "To empower the youth of the country to achieve their full potential, and through them enable India to find its rightful place in the community of nations". The NYP–2014 has defined 'youth'as persons in the age group of 15–29 years.

The Government of India also formulated the National Policy for Skill Development and Entrepreneurship in 2015 to provide an umbrella framework to all skilling activities being carried out within the country, and to align these to common standards and link skilling with demand centres.

It appears from the above discussion that the growth rate of population is widely variant over space and time in the country and also highlights various social problems related to the growth of population. However, in order to have a better insight into the growth pattern of population it is also necessary to look into the social composition of population.

Population Composition

Population composition is a distinct field of study within population geography with a vast coverage of analysis of age and sex, place of residence, ethnic characteristics, tribes, language, religion, marital status, literacy and education, occupational characteristics, etc. In this section, the composition of Indian population with respect to their rural-urban characteristics, language, religion and pattern of occupation will be discussed.

Rural – Urban Composition

Composition of population by their respective places of residence is an important indicator of social and economic characteristics. This becomes even more significant for a country where about 68.8 per cent of its total population lives in village (2011).

© NCERT not to be republished

Do you know that India has 640,867 villages according to the Census 2011 out of which 597,608 (93.2 per cent) are inhabited villages? However, the distribution of rural population is not uniform throughout the country. You might have noted that the states like Himachal Pradesh and Bihar have very high percentage of rural population. The states of Goa and Mizoram have only little over half of their total population residing in villages.

The Union Territories, on the other hand, have smaller proportion of rural population, except Dadra and Nagar Haveli (53.38 per cent). The size of villages also varies considerably. It is less than 200 persons in the hill states of north-eastern India, Western Rajasthan and Rann of Kuchchh and as high as 17 thousand persons in the states of Kerala and in parts of Maharashtra. A thorough examination of the pattern of distribution of rural population of India reveals that both at intra-State and inter-State levels, the relative degree of urbanisation and extent of rural-urban migration regulate the concentration of rural population.

You have noted that contrary to rural population, the proportion of urban population (31.16 per cent) in India is quite low but it is showing a much faster rate of growth over the decades. The growth rate of urban population has accelerated due to enhanced economic development and improvement in health and hygienic conditions.

The distribution of urban population too, as in the case of total population, has a wide variation throughout the country (Appendix–iii).

Activity

Compare the data of Appendix (iii) and identify the states/UTs with very high and very low proportion of urban population.

It is, however, noticed that in almost all the states and Union Territories, there has been a considerable increase of urban population. This indicates both development of urban areas in terms of socio-economic conditions and an increased rate of rural-urban migration. The rural-urban migration is conspicuous in the case of urban areas along the main road links and railroads in the North Indian Plains, the industrial areas around Kolkata, Mumbai, Bengaluru – Mysuru, Madurai – Coimbatore, Ahmedabad – Surat, Delhi – Kanpur and Ludhiana – Jalandhar. In the agriculturally stagnant parts of the middle and lower Ganga Plains, Telengana, non-irrigated Western Rajasthan, remote hilly, tribal areas of north-east, along the flood prone areas of Peninsular India and along eastern part of Madhya Pradesh, the degree of urbanisation has remained low.

Linguistic Composition

India is a land of linguistic diversity. According to Grierson (Linguistic Survey of India, 1903 – 1928), there were 179 languages and as many as 544 dialects in the country. In the context of modern India, there are about 22 scheduled languages and a number of non-scheduled languages.

Activity

See how many languages appear on a Rs 10 note.

Among the scheduled languages, the speakers of Hindi have the highest percentage. The smallest language groups are Sanskrit, Bodo and Manipuri speakers (2011). However, it is noticed that the linguistic regions in the country do not have a sharp and distinct boundary, rather they gradually merge and overlap in their respective frontier zones.

Linguistic Classification

The speakers of major Indian languages belong to four language families, which have their sub-families and branches or groups. This can be better understood from Table 1.2.

Religious Composition

Religion is one of the most dominant forces affecting the cultural and political life of the majority of Indians. Since religion virtually permeates into almost all the aspects of people's family and community lives, it is important to study the religious composition in detail.

© NCERT not to be republished

Table 1.2 : Classification of Modern Indian Languages

Family	Sub-Family	Branch/Group	Speech Areas
Austric (Nishada) 1.38%	Austro-Asiatic	Mon-Khmer	Meghalaya, Nicobar Islands
		Munda	West Bengal, Bihar, Orissa, Assam, Madhya Pradesh, Maharashtra
	Austro- Nesian		Outside India
Dravidian (Dravida) 20%		South-Dravidian	Tamil Nadu, Karnataka, Kerala
		Central Dravidian	Andhra Pradesh, M.P., Orissa, Maharashtra
		North Dravidian	Bihar, Orissa, West Bengal, Madhya Pradesh
Sino-Tibetan (Kirata) 0.85%	Tibeto - Myanmari	Tibeto-Himalayan	Jammu & Kashmir, Himachal Pradesh, Sikkim
		North Assam	Arunachal Pradesh
	Siamese-Chinese	Assam- Myanmari	Assam, Nagaland, Manipur, Mizoram, Tripura, Meghalaya
Indo - European (Aryan) 73%	Indo-Aryan	Iranian	Outside India
		Dardic	Jammu & Kashmir
		Indo-Aryan	Jammu & Kashmir, Punjab, Himachal Pradesh, U.P., Rajasthan, Haryana, M.P., Bihar, Orissa, West Bengal, Assam, Gujarat, Maharashtra, Goa.

Source : Ahmed, A. (1999) : Social Geography, Rawat Publication, New Delhi

Activity

Look at Table 1.2 and prepare a pie diagram of linguistic composition of India showing the sectoral shares of each linguistic group.

Or

Prepare a qualitative symbol map of India showing the distribution of different linguistic groups in the country.

The spatial distribution of religious communities in the country (Appendix–v) shows that there are certain states and districts having large numerical strength of one religion, while the same may be very negligibly represented in other states.

Hindus are distributed as a major group in many states (ranging from 70 - 90 per cent and above) except the districts of states along Indo-Bangladesh border, Indo-Pak border, Jammu & Kashmir, Hill States of North-East and in scattered areas of Deccan Plateau and Ganga Plain.

Table 1.3 : Religious Communities of India, 2011

Religious Group	2011	
	Population (in million)	% of Total
Hindus	966.3	79.8
Muslims	172.2	14.2
Christians	27.8	2.3
Sikhs	20.8	1.7
Buddhists	8.4	0.7
Jains	4.5	0.4
Other Religions and Persuasions (ORP)	7.9	0.7
Religion Not Stated	2.9	0.2

Source : Census of India, 2011

Muslims, the largest religious minority, are concentrated in Jammu & Kashmir, certain districts of West Bengal and Kerala, many districts of Uttar Pradesh , in and around Delhi and in Lakshadweep. They form majority in Kashmir valley and Lakshadweep.

© NCERT not to be republished

Religion and Landscape

Formal expression of religions on landscape is manifested through sacred structures, use of cemetries and assemblages of plants and animals, groves of trees for religious purposes. Sacred structures are widely distributed throughout the country. These may range from inconspicuous village shrines to large Hindu temples, monumental masjids or ornately designed cathedrals in large metropolitan cities. These temples, masjids, gurudwaras, monastries and churches differ in size, form, space – use and density, while attributing a special dimension to the total landscape of the area.

The Christian population is distributed mostly in rural areas of the country. The main concentration is observed along the Western coast around Goa, Kerala and also in the hill states of Meghalaya, Mizoram, Nagaland, Chotanagpur area and Hills of Manipur.

Sikhs are mostly concentrated in relatively small area of the country, particularly in the states of Punjab, Haryana and Delhi.

Jains and Buddhists, the smallest religious groups in India have their concentration only in selected areas of the country. Jains have major concentration in the urban areas of Rajasthan, Gujarat and Maharashtra, while the Buddhists are concentrated mostly in Maharashtra. The other areas of Buddhist majority are Sikkim, Arunachal Pradesh, Ladakh in Jammu & Kashmir, Tripura, and Lahul and Spiti in Himachal Pradesh.

The other religions of India include Zoroastrians, tribal and other indigenous faiths and beliefs. These groups are concentrated in small pockets scattered throughout the country.

Composition of Working Population

The population of India according to their economic status is divided into three groups, namely; main workers, marginal workers and non-workers.

It is observed that in India, the proportion of workers (both main and marginal) is only 39.8 per cent (2011) leaving a vast majority of about 60 per cent as non-workers. This indicates an economic status in which there is a larger proportion of dependent population, further indicating possible existence of large number of unemployed or under employed people.

Standard Census Definition

Main Worker is a person who works for atleast 183 days (or six months) in a year.

Marginal Worker is a person who works for less than 183 days (or six months) in a year.

What is work participation rate?

The proportion of working population, of the states and Union Territories show a variation from about 29.1 per cent in Lakshdweep to about 51.9 per cent in Himachal Pradesh. The states with larger percentages of workers are Himachal Pradesh, Sikkim, Chhattisgarh, Andhra Pradesh, Karnataka, Arunachal Pradesh, Nagaland, Manipur and Meghalaya. Among the Union Territories, Dadra and Nagar Haveli and Daman and Diu have higher participation rate. It is understood that, in the context of a country like India, the work participation rate tends to be higher in the areas of lower levels of economic development since number of manual workers are needed to perform the subsistence or near subsistence economic activities.

The occupational composition (see box) of India's population (which actually means engagement of an individual in farming, manufacturing, trade, services or any kind of professional activities) show a large proportion of primary sector workers compared to secondary and tertiary sectors. About 54.6 per cent of total working population are cultivators and agricultural labourers, whereas only 3.8% of workers are engaged in household industries and 41.6 % are other workers including non-household industries, trade, commerce, construction and repair and other services. As far as the occupation of country's male and female population is concerned, male workers out-number female workers in all the three sectors (Fig.1.4 and Table 1.4).

© NCERT not to be republished

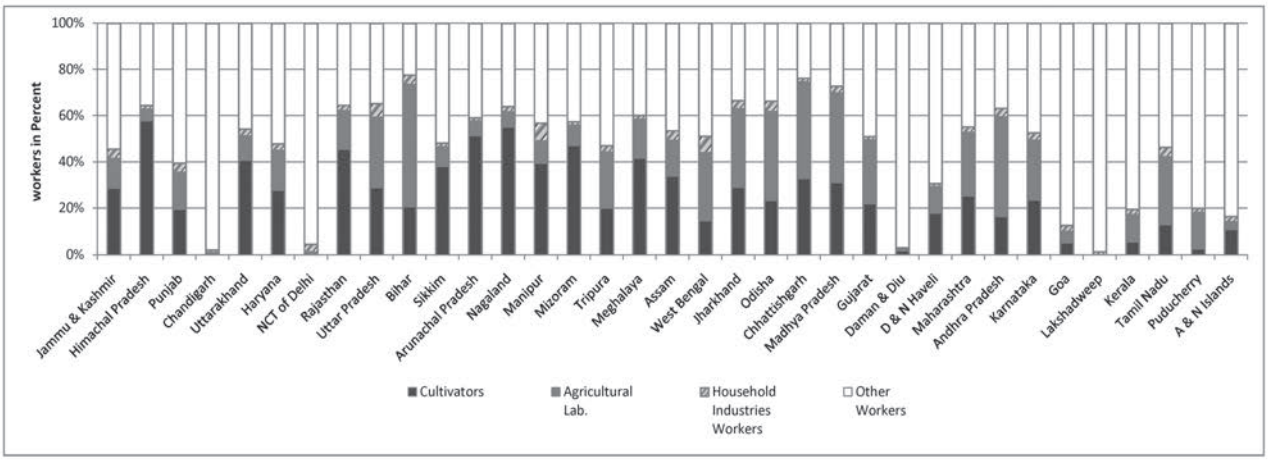


Fig. 1.4 : India – Occupational Structure, 2011

Promoting Gender Sensitivity through 'Beti Bachao–Beti Padhao' Social Campaign

The division of the society into male, female and transgender is believed to be natural and biological. But, in reality, there are social constructs and roles assigned to individuals which are reinforced by social institutions. Consequently, these biological differences become the basis of social differentiations, discriminations and exclusions. The exclusion of over half of the population becomes a serious handicap to any developing and civilised society. It is a global challenge, which has been acknowledged by the UNDP when it mentioned that, "If development is not engendered it is endangered" (HDR UNDP 1995). Discrimination, in general, and gender discrimination, in particular, is a crime against humanity.

All efforts need to be made to address the denial of opportunities of education, employment, political representation, low wages for similar types of work, disregard to their entitlement to live a dignified life, etc. A society, which fails to acknowledge and take effective measures to remove such discriminations, cannot be treated as a civilised one. The Government of India has duly acknowleged the adverse impacts of these discriminations and launched a nationwide campaign called 'Beti Bachao – Beti Padhao'.

Occupational Categories

The 2011 Census has divided the working population of India into four major categories :

1. Cultivators
2. Agricultural Labourers
3. Household Industrial Workers
4. Other Workers.

Table 1.4 : Sectoral Composition of workforce in India, 2011

Categories	Population			
	Persons	% to total Workers	Male	Female
Primary	26,30,22,473	54.6	16,54,47,075	9,75,75,398
Secondary	1,83,36,307	3.8	97,75,635	85,60,672
Tertiary	20,03,84,531	41.6	15,66,43,220	4,37,41,311

© NCERT not to be republished

Activity

Prepare composite bar graphs, one for India and the other for your respective states showing the proportion of male and female workers in agriculture, household industries and other sectors, and compare.

The number of female workers is relatively high in primary sector, though in recent years there has been some improvement in work participation of women in secondary and tertiary sectors.

It is important to note that the proportion of workers in agricultural sector in India has shown a decline over the last few decades (58.2% in 2001 to 54.6% in 2011). Consequently, the participation rate in secondary and tertiary sector has registered an increase. This indicates a shift of dependence of workers from farm-based occupations to non-farm based ones, indicating a sectoral shift in the economy of the country.

The spatial variation of work participation rate in different sectors in the country (Appendix–v and vA) is very wide. For instance, the states like Himachal Pradesh and Nagaland have very large shares of cultivators. On the other hand states like Bihar, Andhra Pradesh, Chhattisgarh, Odisha, Jharkhand, West Bengal and Madhya Pradesh have higher proportion of agricultural labourers. The highly urbanised areas like Delhi, Chandigarh and Puducherry have a very large proportion of workers being engaged in other services. This indicates not only availability of limited farming land, but also large scale urbanisation and industrialisation requiring more workers in non-farm sectors.

EXERCISES

1. Choose the right answers of the followings from the given options.

(i) India's population as per 2011 census is :

(a) 1028 million (c) 3287 million

(b) 3182 million (d) 1210 million

(ii) Which one of the following states has the highest density of population in India?

(a) West Bengal (c) Uttar Pradesh

(b) Kerala (d) Bihar

(iii) Which one of the following states has the highest proportion of urban population in India according to 2011 Census?

(a) Tamil Nadu (c) Kerala

(b) Maharashtra (d) Goa

(iv) Which one of the following is the largest linguistic group of India?

(a) Sino – Tibetan (c) Austric

(b) Indo – Aryan (d) Dravidian

© NCERT not to be republished

Reprint 2026-27

2. Answer the following questions in about 30 words.

(i) Very hot and dry and very cold and wet regions of India have low density of population. In this light, explain the role of climate on the distribution of population.

(ii) Which states have large rural population in India? Give one reason for such large rural population.

(iii) Why do some states of India have higher rates of work participation than others?

(iv) 'The agricultural sector has the largest share of Indian workers.' – Explain.

3. Answer the following questions in about 150 words.

(i) Discuss the spatial pattern of density of population in India.

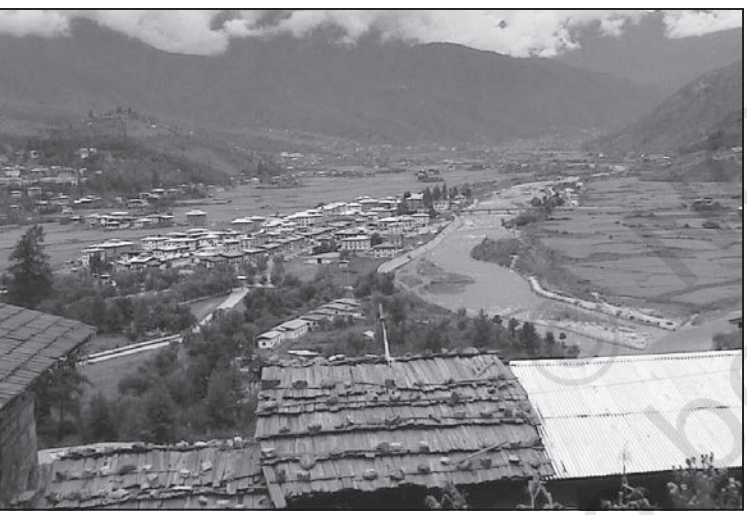
(ii) Give an account of the occupational structure of India's population.

© NCERT not to be republished

Unit II
Chapter 2

12099CH04

HUMAN SETTLEMENTS



Human Settlement means cluster of dwellings of any type or size where human beings live. For this purpose, people may erect houses and other structures and command some area or territory as their economic support-base. Thus, the process of settlement inherently involves grouping of people and apportioning of territory as their resource base.

Settlements vary in size and type. They range from a hamlet to metropolitan cities. With size, the economic character and social structure of settlements changes and so do its ecology and technology. Settlements could be small and sparsely spaced; they may also be large and closely spaced. The sparsely located small settlements are called villages, specialising in agriculture or other primary activities. On the other hand, there are fewer but larger settlements which are termed as urban settlements specialising in secondary and tertiary activities. The basic differences between rural and urban settlements are as follows :

- The rural settlements derive their life support or basic economic needs from land based primary economic activities, whereas, urban settlements, depend on processing of raw materials and manufacturing of finished goods on the one hand and a variety of services on the other.
- Cities act as nodes of economic growth, provide goods and services not only to urban dwellers but also to the people of the rural settlements in their hinterlands in return for food and raw materials. This functional relationship between the urban and rural settlements takes place through transport and communication network.
- Rural and urban settlements differ in terms of social relationship, attitude and outlook. Rural people are less mobile and therefore, social relations among them are intimate. In urban areas, on the other hand, way of life is complex and fast, and social relations are formal.

Types of Rural Settlement

Types of the settlement are determined by the extent of the built-up area and inter-house

© NCERT not to be republished

distance. In India compact or clustered village of a few hundred houses is a rather universal feature, particularly in the northern plains. However, there are several areas, which have other forms of rural settlements. There are various factors and conditions responsible for having different types of rural settlements in India. These include: (i) physical features – nature of terrain, altitude, climate and availability of water (ii) cultural and ethenic factors – social structure, caste and religion (iii) security factors – defence against thefts and robberies. Rural settlements in India can broadly be put into four types:

- Clustered, agglomerated or nucleated,
- Semi-clustered or fragmented,
- Hamleted, and
- Dispersed or isolated.

Clustered Settlements

The clustered rural settlement is a compact or closely built up area of houses. In this type of village the general living area is distinct and separated from the surrounding farms, barns and pastures. The closely built-up area and its

Fig. 2.1 : Clustered Settlements in the North-eastern states

intervening streets present some recognisable pattern or geometric shape, such as rectangular, radial, linear, etc. Such settlements are generally found in fertile alluvial plains and in the northeastern states. Sometimes, people live in compact village for security or defence reasons, such as in the Bundelkhand region of central India and in Nagaland. In Rajasthan, scarcity of water has necessitated compact settlement for maximum utilisation of available water resources.

Semi-Clustered Settlements

Semi-clustered or fragmented settlements may result from tendency of clustering in a restricted area of dispersed settlement. More often such a pattern may also result from segregation or fragmentation of a large compact village. In this case, one or more sections of the village society choose or is forced to live a little away from the main cluster or village. In such cases, generally, the land-owning and dominant community occupies the central part of the main village, whereas people of lower strata of society and menial workers settle on the outer flanks of the village. Such settlements are widespread in the Gujarat plain and some parts of Rajasthan.

Fig. 2.2 : Semi-clustered settlements

Hamleted Settlements

Sometimes settlement is fragmented into several units physically separated from each other bearing a common name. These units are locally called *panna*, *para*, *palli*, *nagla*, *dhani*, etc. in various parts of the country. This segmentation of a large village is often motivated by social and ethnic factors. Such villages are more frequently found in the middle and lower Ganga plain, Chhattisgarh and lower valleys of the Himalayas.

Dispersed Settlements

Dispersed or isolated settlement pattern in India appears in the form of isolated huts or hamlets of few huts in remote jungles, or on small hills

© NCERT not to be republished

Fig. 2.3 : Dispersed settlements in Nagaland

with farms or pasture on the slopes. Extreme dispersion of settlement is often caused by extremely fragmented nature of the terrain and land resource base of habitable areas. Many areas of Meghalaya, Uttarakhand, Himachal Pradesh and Kerala have this type of settlement.

Urban Settlements

Unlike rural settlements, urban settlements are generally compact and larger in size. They are engaged in a variety of non-agricultural, economic and administrative functions. As mentioned earlier, cities are functionally linked to rural areas around them. Thus, exchange of goods and services is performed sometimes directly and sometimes through a series of market towns and cities. Thus, cities are connected directly as well as indirectly with the villages and also with each other.

> The census of India, 1991 defines urban settlements as "All places which have municipality, corporation, cantonment board or notified town area committee and have a minimum population of 5000 persons, at least 75 per cent of male workers are engaged in non-agriculture pursuits and a density of population of at least 400 persons per square kilometer are urban.

Evolution of Towns in India

Towns flourished since prehistoric times in India. Even at the time of Indus valley civilisation, towns like Harappa and Mohanjodaro were in existence. The following period has witnessed evolution of towns. It continued with periodic ups and downs until the arrival of Europeans in India in the eighteenth century. On the basis of their evolution in different periods, Indian towns may be classified as:

• Ancient towns, • Medieval towns, and • Modern towns.

Ancient Towns

There are number of towns in India having historical background spanning over 2000 years. Most of them developed as religious and cultural centres. Varanasi is one of the important towns among these. Prayag (Prayagraj), Pataliputra (Patna), Madurai are some other examples of ancient towns in the country.

Medieval Towns

About 100 of the existing towns have their roots in the medieval period. Most of them developed as headquarters of principalities and kingdoms. These are fort towns which came up on the ruins of ancient towns. Important among them are Delhi, Hyderabad, Jaipur, Lucknow, Agra and Nagpur.

Modern Towns

The British and other Europeans have developed a number of towns in India. Starting their foothold on coastal locations, they first developed some trading ports such as Surat, Daman, Goa, Pondicherry, etc. The British later consolidated their hold around three principal nodes – Mumbai (Bombay), Chennai (Madras), and Kolkata (Calcutta) – and built them in the British style. Rapidly

Fig. 2.4 : A view of the modern city

extending their domination either directly or through control over the princely states, they established their administrative centres, hill-towns as summer resorts, and added new civil,

© NCERT not to be republished

Table 2.1 : India – Trends of Urbanisation 1901-2011

Year	Number of Towns/UAs	Urban Population (in Thousands)	% of Total Population	Decennial Growth (%)
1901	1,827	25,851.9	10.84	—
1911	1,815	25,941.6	10.29	0.35
1921	1,949	28,086.2	11.18	8.27
1931	2,072	33,456.0	11.99	19.12
1941	2,250	44,153.3	13.86	31.97
1951	2,843	62,443.7	17.29	41.42
1961	2,365	78,936.6	17.97	26.41
1971	2,590	1,09,114	19.91	38.23
1981	3,378	1,59,463	23.34	46.14
1991	4,689	2,17,611	25.71	36.47
2001	5,161	2,85,355	27.78	31.13
2011*	6,171	3,77,000	31.16	31.08

**Source: Census of India, 2011 http.//www.censusindia.gov.in (Provisional)*

administrative and military areas to them. Towns based on modern industries also evolved after 1850. Jamshedpur can be cited as an example.

After independence, a large number of towns have been developed as administrative headquarters, e.g., Chandigarh, Bhubaneswar, Gandhinagar, Dispur, etc., and industrial centres, such as Durgapur, Bhilai, Sindri, Barauni. Some old towns also developed as satellite towns around metropolitan cities, such as Ghaziabad, Rohtak, Gurugram around Delhi. With increasing investment in rural areas, a large number of medium and small towns have developed all over the country.

Urbanisation in India

The level of urbanisation is measured in terms of percentage of urban population to total population. The level of urbanisation in India in 2011 was 31.16 per cent, which is quite low in comparison to developed countries. Total urban population has increased eleven-fold during the twentieth century. Enlargement of urban centres and emergence of new towns have played a significant role in the growth of urban population and urbanisation in the country. (Table 2.1). But the growth rate of urbanisation has slowed down during last two decades.

Functional Classification of Towns

Apart from their role as central or nodal places, many towns and cities perform specialised services. Some towns and cities specialise in certain functions and they are known for some specific activities, products or services. However, each town performs a number of functions. On the basis of dominant or specialised functions, Indian cities and towns can be broadly classified as follows:

Administrative towns and cities

Towns supporting administrative headquarters of higher order are administrative towns, such as Chandigarh, New Delhi, Bhopal, Shillong, Guwahati, Imphal, Srinagar, Gandhinagar, Jaipur, Chennai, etc.

Industrial towns

Industries constitute prime motive force of these cities, such as Mumbai, Salem, Coimbatore, Modinagar, Jamshedpur, Hugli, Bhilai, etc.

Transport Cities

They may be ports primarily engaged in export and import activities such as Kandla, Cochin, Kozhikode, Vishakhapatnam, etc., or hubs of inland transport, such as Agra, Dhulia, Pandit Deendayal Upadhyay Nagar, Itarsi, Katni, etc.

© NCERT not to be republished

Commercial towns

Towns and cities specialising in trade and commerce are kept in this class. Kolkata, Saharanpur, Satna, etc., are some examples.

Mining towns

These towns have developed in mineral rich areas such as Raniganj, Jharia, Digboi, Ankaleshwar, Singrauli, etc.

Garrisson Cantonment towns

These towns emerged as garrisson towns such as Ambala, Jalandhar, Mhow, Babina, Udhampur, etc.

Smart Cities Mission

The objective of the *Smart Cities Mission* is to promote cities that provide core infrastructure, a clean and sustainable environment and give a decent quality of life to its citizens. One of the features of Smart Cities is to apply smart solutions to infrastructure and services in order to make them better. For example, making areas less vulnerable to disasters, using fewer resources and providing cheaper services. The focus is on sustainble and inclusive development and the idea is to look at compact areas, create a replicable model, which will act like a lighthouse to other aspiring cities.

List the urban agglomerations/cities state-wise and see the state-wise population under this category of cities.

Educational towns

Starting as centres of education, some of the towns have grown into major campus towns, such as Roorki, Varanasi, Aligarh, Pilani, Prayagraj, etc.

Religious and cultural towns

Varanasi, Mathura, Amritsar, Madurai, Puri, Ajmer, Pushkar, Tirupati, Kurukshetra, Haridwar, Ujjain came to prominence due to their religious/cultural significance.

Tourist towns

Nainital, Mussoorie, Shimla, Pachmarhi, Jodhpur, Jaisalmer, Udagamandalam (Ooty), Mount Abu are some of the tourist destinations.

The cities are not static in their function. The functions change due to their dynamic nature.

Even specialised cities, as they grow into metropolises become multifunctional wherein industry, business, administration, transport, etc., become important. The functions get so intertwined that the city can not be categorised in a particular functional class.

EXERCISES

1. Choose the right answers of the following from the given options.

(i) Which one of the following towns is NOT located on a river bank?

(a) Agra
(b) Bhopal
(c) Patna
(d) Kolkata

© NCERT not to be republished

(ii) Which one of the following is NOT the part of the definition of a town as per the census of India?

(a) Population density of 400 persons per sq km.

(b) Presence of municipality, corporation, etc.

(c) More than 75% of the population engaged in primary sector.

(d) Population size of more than 5,000 persons.

(iii) In which one of the following environments does one expect the presence of dispersed rural settlements?

(a) Alluvial plains of Ganga

(b) Arid and semi-arid regions of Rajasthan

(c) Lower valleys of Himalayas

(d) Forests and hills in north-east

2. Answer the following questions in about 30 words.

(i) What are garrisson towns? What is their function?

(ii) What are the main factors for the location of villages in desert regions?

3. Answer the following questions in about 150 words.

(i) Discuss the features of different types of rural settlements. What are the factors responsible for the settlement patterns in different physical environments?

(ii) Can one imagine the presence of only one-function town? Why do the cities become multi-functional?

© NCERT not to be republished

Unit III
Chapter 3

12099CH05

LAND RESOURCES AND AGRICULTURE

You must have observed that the land around you is put to different uses. Some land is occupied by rivers, some may have trees and on some parts roads and buildings have been built. Different types of lands are suited to different uses. Human beings thus, use land as a resource for production as well as residence and recreation. Thus, the building of your school, roads on which you travel, parks in which you play, fields in which crops are grown and the pastures where animals graze represent different uses to which land is put.

Land Use Categories

Land-use records are maintained by land revenue department. The land use categories add up to *reporting area,* which is somewhat different from the *geographical area.* The Survey of India is responsible for measuring *geographical area* of administrative units in India. Have you ever used a map prepared by Survey of India? The difference between the two concepts are that while the former changes somewhat depending on the estimates of the land revenue records, the latter does not change and stays fixed as per Survey of India measurements. You may be familiar with land use categories as they are also included in your Social Science textbook of Class X.

The land-use categories as maintained in the Land Revenue Records are as follows :

(i) ***Forests*** **:** It is important to note that area under actual forest cover is different from area classified as forest. The latter is the area which the Government has identified and demarcated for forest growth. The land revenue records are consistent with the latter definition. *Thus, there may be an increase in this category without any increase in the actual forest cover.*

(ii) ***Barren and Wastelands :*** The land which may be classified as a wasteland such as barren hilly terrains, desert lands, ravines, etc. normally cannot be brought under cultivation with the available technology.

© NCERT not to be republished

(iii) ***Land put to Non-agricultural Uses:*** Land under settlements (rural and urban), infrastructure (roads, canals, etc.), industries, shops, etc., are included in this category. An expansion in the secondary and tertiary activities would lead to an increase in this category of land-use.

(iv) ***Area under Permanent Pastures and Grazing Lands :*** Most of this type land is owned by the village '*Panchayat*' or the Government. Only a small proportion of this land is privately owned. The land owned by the village panchayat comes under 'Common Property Resources'.

(v) ***Area under Miscellaneous Tree Crops and Groves (Not included in Net sown Area) :*** The land under orchards and fruit trees are included in this category. Much of this land is privately owned.

(vi) ***Culturable Wasteland :*** Any land which is left fallow (uncultivated) for more than five years is included in this category. It can be brought under cultivation after improving it through reclamation practices.

(vii) ***Current Fallow:*** This is the land which is left without cultivation for one or less than one agricultural year. Fallowing is a cultural practice adopted for giving the land rest. The land recoups the lost fertility through natural processes.

(viii) ***Fallow other than Current Fallow :*** This is also a cultivable land which is left uncultivated for more than a year but less than five years. If the land is left uncultivated for more than five years, it would be categorised as culturable wasteland.

(ix) ***Net Area Sown:*** The physical extent of land on which crops are sown and harvested is known as net sown area.

Land-use Changes in India

Land-use in a region, to a large extent, is influenced by the nature of economic activities carried out in that region. However, while economic activities change over time, land, like many other natural resources, is fixed in terms of its area. At this stage, one needs to appreciate three types of changes that an economy undergoes, which affect land-use.

(i) The **size of the economy** (measured in terms of value for all the goods and services produced in the economy) grows over time as a result of increasing population, change in income levels, available technology and associated factors. As a result, the pressure on land will increase with time and marginal lands would come under use.

(ii) Secondly, **the composition of the economy** would undergo a change over time. In other words, the secondary and the tertiary sectors usually grow much faster than the primary sector, specifically the agricultural sector. This type of change is common in developing countries, like India. This process would result in a gradual shift of land from agricultural uses to non-agricultural uses. You would observe that such changes are sharp around large urban areas. The agricultural land is being used for building purposes.

(iii) Thirdly, though the contribution of the agricultural activities reduces over time, the pressure on land for agricultural activities does not decline. The reasons for continued pressure on agricultural land are:

(a) In developing countries, the share of population dependent on agriculture usually declines much more slowly compared to the decline in the sector's share in GDP.

(b) The number of people that the agricultural sector has to feed is increasing day by day.

© NCERT not to be republished

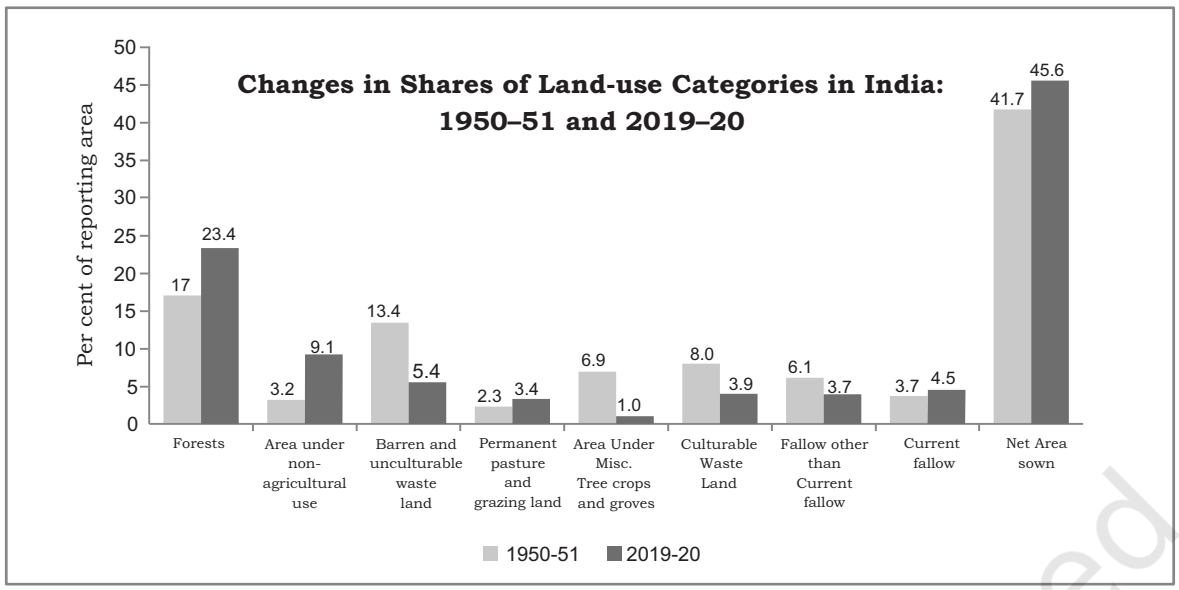


Fig. 3.1

Activity

Compare the changes of land-use between 1950–51 and 2019–20.

India has undergone major changes within the economy over the past four or five decades, and this has influenced the land-use changes in the country. These changes between 1950–51 and 2019–20 have been shown in Fig. 3.1. There are two points that you need to remember before you derive some meaning from this figure. Firstly, the percentages shown in the figure have been derived with respect to the reporting area. Secondly, since even the reporting area has been relatively constant over the years, a decline in one category usually leads to an increase in some other category.

Five categories have undergone increases, while four have registered declines. Share of area under forest, area under non-agricultural uses, permanent pasture and grazing land, current fallow lands and net area sown have shown an increase. The following observations can be made about these increases:

(i) The *rate of increase* is the highest in case of area under non-agricultural uses. This is due to the changing structure of Indian economy, which is increasingly depending on the contribution from industrial and services sectors and expansion of related infrastructural facilities. Also, an expansion of area under both urban and rural settlements has added to the increase. Thus, the area under non-agricultural uses is increasing at the expense of wastelands and agricultural land.

(ii) The increase in the share under forest, as explained before, can be accounted for by increase in the demarcated area under forest rather than an actual increase in the forest cover in the country.

(iii) The increase in the current fallow cannot be explained from information pertaining to only two points. The trend of current fallow fluctuates a great deal over years, depending on the variability of rainfall and cropping cycles.

(iv) The increase in net area sown is a recent phenomenon due to use of culturable waste land for agricultural pupose. Before which it was registering a slow decrease. There are indications that most of the decline had occurred due to the increases in area under non-agricultural use. (Note : the expansion of building activity on agricultural land in your village and city).

© NCERT not to be republished

The four categories that have registered a decline are barren and wasteland, culturable wasteland, area under tree crops and groves and fallow other than current fallow lands.

The following explanations can be given for the declining trends:

(i) As the pressure on land increased, both from the agricultural and non-agricultural sectors, the wastelands and culturable wastelands have witnessed decline over time.

(ii) The decline in land under tree crops and groves can be explained by pressure from agricultural land.

Activity

What is the difference between actual increase and rate of increase? Work out the actual increase and rate of increases for all the land use categories between 1950–51 and 2019–20 from the data given in the Appendix (vi). Explain the results.

Note for Teacher

For calculating actual increase, the difference of the land-use categories should be worked out over the two periods.

For deriving the rate of increase, simple growth rate i.e. (difference of values between the two time points i.e. value of terminal year minus base year / base year or 1960-61 value) should be used, e.g.

$$\frac{\text{Net sown Area in 2019–20} - \text{Net sown Area in 1950–51}}{\text{Net sown Area in 1950–51}} \times 100$$

Common Property Resources

Land, according to its ownership can broadly be classified under two broad heads – private land and common property resources (CPRs). While the former is owned by an individual or a group of individuals, the latter is owned by the state meant for the use of the community. CPRs provide fodder for the livestock and fuel for the households along with other minor forest products like fruits, nuts, fibre, medicinal plants, etc. In rural areas, such land is of particular relevance for the livelihood of the landless and marginal farmers and other weaker sections since many of them depend on income from their livestock due to the fact that they have limited access to land. CPRs also are important for women as most of the fodder and fuel collection is done by them in rural areas. They have to devote long hours in collecting fuel and fodder from a degraded area of CPR.

CPRs can be defined as community's natural resource, where every member has the right of access and usage with specified obligations, without anybody having property rights over them. Community forests, pasture lands, village water bodies and other public spaces where a group larger than a household or family unit exercises rights of use and carries responsibility of management are examples of CPRs.

Agricultural Land Use in India

Land resource is more crucial to the livelihood of the people depending on agriculture:

(i) Agriculture is a purely land based activity unlike secondary and tertiary activities. In other words, contribution of land in agricultural output is more compared to its contribution in the outputs in the other sectors. Thus, lack of access to land is directly correlated with incidence of poverty in rural areas.

(ii) Quality of land has a direct bearing on the productivity of agriculture, which is not true for other activities.

(iii) In rural areas, aside from its value as a productive factor, land ownership has a social value and serves as a security for credit, natural hazards or life contingencies, and also adds to the social status.

An estimation of the total stock of agricultural land resources (i.e. total cultivable land) can be arrived at by adding up net sown area, all fallow lands and culturable wasteland. It may be observed from Table 3.1 that over the years, there has been a marginal decline in the available total stock of cultivable land as a percentage to total reporting area. There has been a greater decline of cultivated land, in spite of a corresponding decline of cultivable wasteland.

© NCERT not to be republished

Table 3.1 : Composition of Total Cultivable Land

Agricultural Land-use Categories	*As a percentage of Reporting Area*		*As a percentage of total cultivable land*	
	1950-51	2019-20	1950-51	2019-20
Culturable Waste land	8.0	3.9	13.4	6.8
Fallow other than Current Fallow	6.1	3.7	10.2	6.4
Current Fallow	3.7	4.5	6.2	7.8
Net Area Sown	41.7	45.6	70.0	79.0
Total Cultivable Land	59.5	57.7	100.00	100.00

It is clear from the above discussion that the scope for bringing in additional land under net sown area in India is limited. There is, thus, an urgent need to evolve and adopt land-saving technologies. Such technologies can be classified under two heads – those which raise the yield of any particular crop per unit area of land and those which increase the total output per unit area of land from all crops grown over one agricultural year by increasing land-use intensity. The advantage of the latter kind of technology is that along with increasing output from limited land, it also increases the demand for labour significantly. For a land scarce but labour abundant country like India, a high cropping intensity is desirable not only for fuller utilisation of land resource, but also for reducing unemployment in the rural economy.

The ***cropping intensity (CI)*** is calculated as follows :

$$\text{Cropping Intensity in percentage} = \frac{\text{GCA}}{\text{NSA}} \times 100$$

Cropping Seasons in India

There are three distinct crop seasons in the northern and interior parts of country, namely ***kharif***, ***rabi*** and ***zaid***. The *kharif* season largely coincides with Southwest Monsoon under which the cultivation of tropical crops, such as rice, cotton, jute, jowar, bajra and tur is possible. The ***rabi*** season begins with the onset of winter in October-November and ends in March-April. The low temperature conditions during this season facilitate the cultivation of temperate and subtropical crops such as wheat, gram and mustard. ***Zaid*** is a short duration summer cropping season beginning after harvesting of rabi crops. The cultivation of watermelons, cucumbers, vegetables and fodder crops during this season is done on irrigated lands. However, this type of distinction in the cropping season does not exist in southern parts of the country. Here, the temperature is high enough to grow tropical crops during any period in the year provided the soil moisture is available. Therefore, in this region same crops can be grown thrice in an agricultural year provided there is sufficient soil moisture.

Types of Farming

On the basis of main source of moisture for crops, the farming can be classified as ***irrigated*** and ***rainfed*** (***barani***). There is difference in the nature of irrigated farming, as well as based on the objective of irrigation, i.e., protective or productive. The objective of protective irrigation is to protect the crops from adverse effects of

Table 3.2 : Cropping Seasons in India

Cropping Season	*Major Crops Cultivated*	
	Northern States	*Southern States*
Kharif June-September	Rice, Cotton, Bajra, Maize, Jowar, Tur	Rice, Maize, Ragi, Jowar, Groundnut
Rabi October – March	Wheat, Gram, Rapeseeds and Mustard, Barley	Rice, Maize, Ragi, Groundnut, Jowar
Zaid April–June	Vegetables, Fruits, Fodder	Rice, Vegetables, Fodder

© NCERT not to be republished

moisture deficiency which often means that irrigation acts as a supplementary source of water over and above the rainfall. The strategy of this kind of irrigation is to provide soil moisture to maximum possible area. Productive irrigation is meant to provide sufficient soil moisture in the cropping season to achieve high productivity. In such irrigation the water input per unit area of cultivated land is higher than protective irrigation. *Rainfed farming* is further classified on the basis of adequacy of soil moisture during cropping season into *dryland* and *wetland* farming. In India, the ***dryland farming*** is largely confined to the regions having annual rainfall less than 75 cm. These regions grow hardy and drought resistant crops such as *ragi*, *bajra*, *moong*, gram and *guar* (fodder crops) and practise various measures of soil moisture conservation and rain water harvesting. In ***wetland farming***, the rainfall is in excess of soil moisture requirement of plants during rainy season. Such regions may face flood and soil erosion hazards. These areas grow various water intensive crops such as rice, jute and sugarcane and practise aquaculture in the fresh water bodies.

Foodgrains

The importance of foodgrains in Indian agricultural economy may be gauged from the fact these crops occupy about two-third of total cropped area in the country. Foodgrains are dominant crops in all parts of the country whether they have subsistence or commercial agricultural economy. On the basis of the structure of grain the foodgrains are classified as cereals and pulses.

Cereals

The cereals occupy about 54 per cent of total cropped area in India. The country produces about 11 per cent cereals of the world and ranks third in production after China and U.S.A. India produces a variety of cereals, which are classified as fine grains (rice, wheat) and coarse grains (jowar, bajra, maize, ragi), etc. Account of important cereals has been given in the following paragraphs :

Rice

Rice is a staple food for the overwhelming majority of population in India. Though, it is considered to be a crop of tropical humid areas, it has many varieties which are grown in different agro-climatic regions. These are successfully grown from sea level to about 2,000 m altitude and from humid areas in eastern India to dry but irrigated areas of Punjab, Haryana, western U.P. and northern Rajasthan. In southern states and West Bengal the climatic conditions allow the cultivation of two or three crops of rice in an agricultural year. In West Bengal farmers grow three crops of rice called '*aus*', '*aman*' and '*boro*'. But in Himalayas and northwestern parts of the country, it is grown as a *kharif* crop during southwest Monsoon season.

India contributes 22.07 per cent of rice production in the world and ranked second after China in 2018. About one-fourth of the total cropped area in the country is under rice cultivation. West Bengal, Uttar Pradesh, and Punjab are the leading rice producing states in the country. The yield level of rice is high in Punjab, Tamil Nadu, Haryana, Andhra Pradesh, Telangana, West Bengal and Kerala. In the first four of these states almost the entire land under rice cultivation is irrigated. Punjab and Haryana are not traditional rice growing areas. Rice

Fig. 3.2 : Rice transplantation in southern parts of India

cultivation in the irrigated areas of Punjab and Haryana was introduced in 1970s following the Green Revolution. Genetically improved varieties of seed, relatively high usage of fertilizers and pesticides and lower levels of susceptibility of the crop to pests due to dry climatic conditions

© NCERT not to be republished

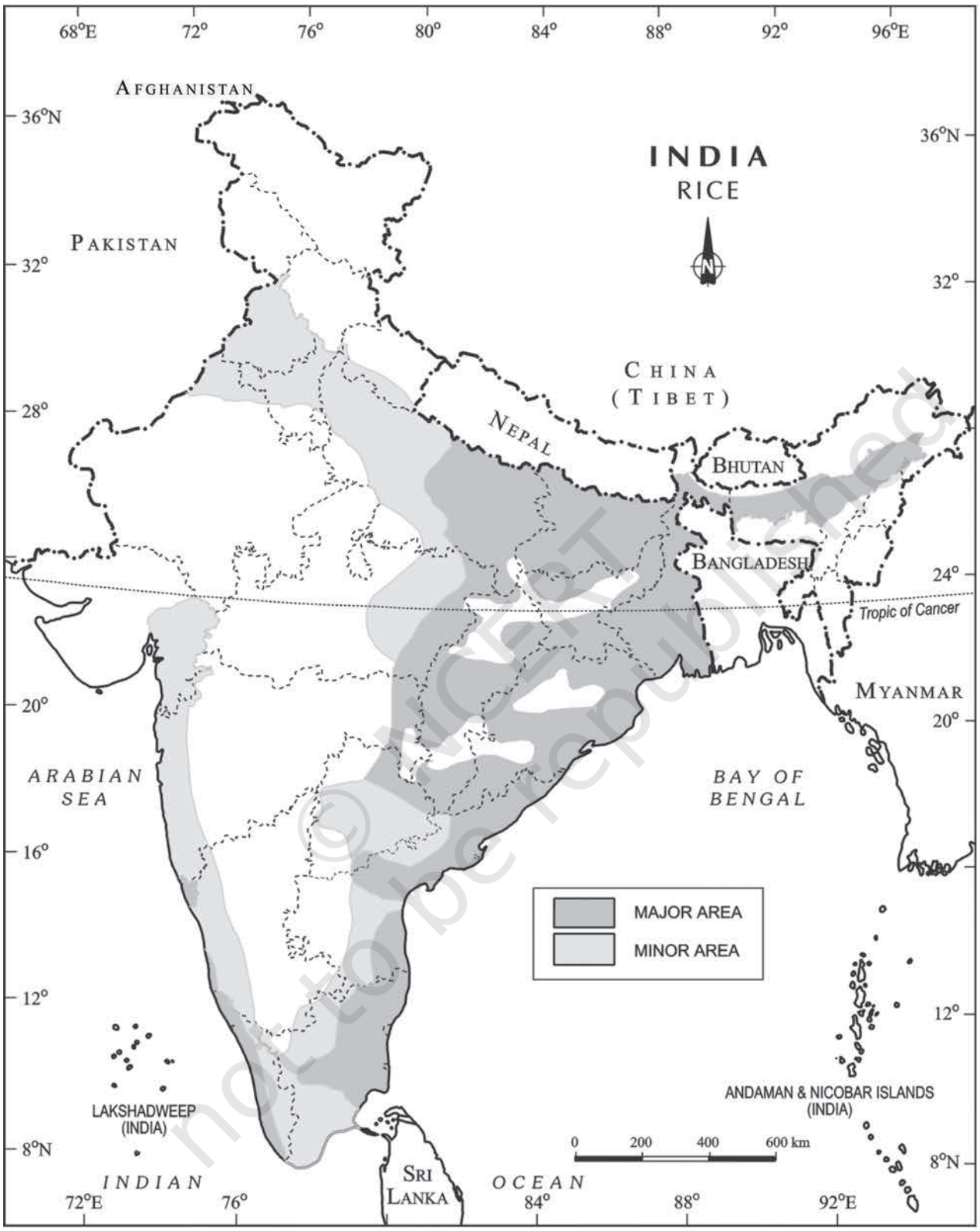


Fig. 3.3 : India – Distribution of Rice

© NCERT not to be republished

are responsible for higher yield of rice in this region. The yield of this crop is very low in rainfed areas of Madhya Pradesh, Chhattisgarh and Odisha.

Wheat

Wheat is the second most important cereal crop in India after rice. India produces about 12.8 per cent of total wheat production of world (2017). It is primarily a crop of temperate zone. Hence, its cultivation in India is done during winter i.e. *rabi* season. About 85 per cent of total area under this crop is concentrated in north and central regions of the country i.e. Indo-Gangetic Plain, Malwa Plateau and Himalayas up to 2,700 m altitude. Being a *rabi* crop, it is mostly grown under irrigated conditions. But it is a rainfed crop in Himalayan highlands and parts of Malwa plateau in Madhya Pradesh.

About 14 per cent of the total cropped area in the country is under wheat cultivation. Uttar Pradesh, Madhya Pradesh, Punjab, Haryana and Rajasthan are leading wheat producing states. The yield level of wheat is very high (above 4,000 k.g. per ha) in Punjab and Haryana whereas, Uttar Pradesh, Rajasthan and Bihar have moderate yields. The states like Madhya Pradesh, Himachal Pradesh and Jammu and Kashmir growing wheat under rainfed conditions have low yield.

Jowar

The coarse cereals together occupy about 16.50 per cent of total cropped area in the country. Among these, *jowar* or *sorghum* alone accounts for about 5.3 per cent of total cropped area. It is main food crop in semi-arid areas of central and southern India. Maharashtra alone produces more than half of the total *jowar* production of the country. Other leading producer states of *jowar* are Karnataka, Madhya Pradesh, Andhra Pradesh and Telangana. It is sown in both *kharif* and *rabi* seasons in southern states. But it is a *kharif* crop in northern India where it is mostly grown as a fodder crop. South of Vindhyachal it is a rainfed crop and its yield level is very low in this region.

Bajra

Bajra is sown in hot and dry climatic conditions in northwestern and western parts of the country. It is a hardy crop which resists frequent dry spells and drought in this region. It is cultivated alone as well as part of mixed cropping. This coarse cereal occupies about 5.2 per cent of total cropped area in the country. Leading producers of *bajra* are the states of Rajasthan, Maharashtra, Gujarat, Uttar Pradesh and Haryana. Yield of this crop has increased during recent years in Rajasthan, Haryana and Gujarat due to introduction of drought resistant varieties and expansion of irrigation under it.

Maize

Maize is a food as well as fodder crop grown under semi-arid climatic conditions and over inferior soils. This crop occupies only about 3.6 per cent of total cropped area. Maize cultivation is not concentrated in any specific region. It is sown all over India exceptPunjab and eastern and north-eastern regions. The leading producers of maize are the states of Karnataka, Madhya Pradesh, Bihar, Andhra Pradesh, Telangana, Rajasthan and Uttar Pradesh. Yield level of maize is higher than other coarse cereals. It is high in southern states and declines towards central parts.

Pulses

Pulses are a very important ingredient of vegetarian food as these are rich sources of proteins. These are legume crops which increase the natural fertility of soils through nitrogen fixation. India is a leading producer of pulses in the world. The cultivation of pulses in the country is largely concentrated in the drylands of Deccan and central plateaus and northwestern parts of the country. Pulses occupy about 11 per cent of the total cropped area in the country. Being the rainfed crops of drylands, the yields of pulses are low and fluctuate from year to year. Gram and *tur* are the main pulses cultivated in India.

© NCERT not to be republished

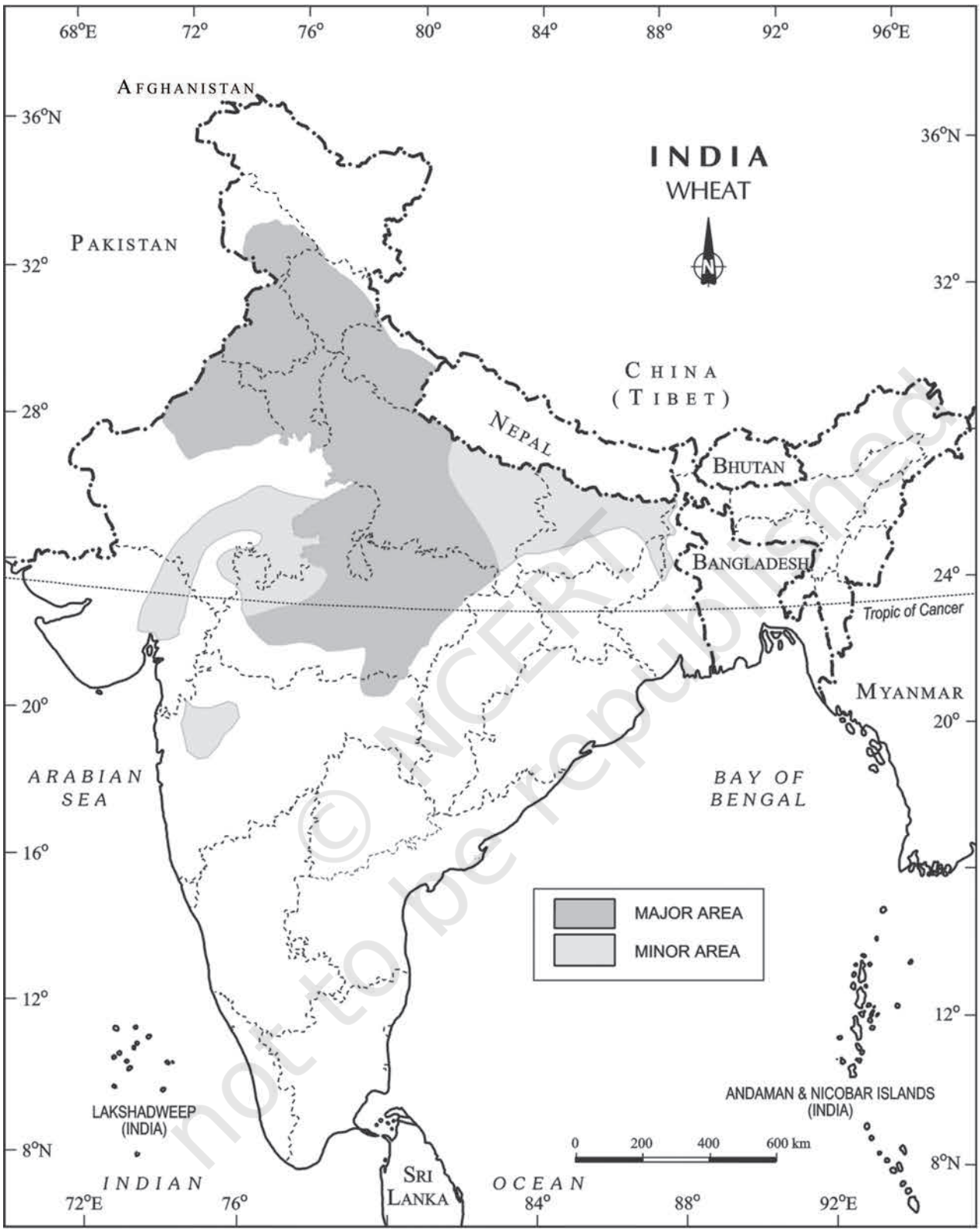


Fig. 3.4 : India – Distribution of Wheat

© NCERT not to be republished

Gram

Gram is cultivated in subtropical areas. It is mostly a rainfed crop cultivated during rabi season in central, western and northwestern parts of the country. Just one or two light showers or irrigations are required to grow this crop successfully. It has been displaced from the cropping pattern by wheat in Haryana, Punjab and northern Rajasthan following the green revolution. At present, gram covers only about 2.8 per cent of the total cropped area in the country. Madhya Pradesh, Uttar Pradesh, Maharashtra, Andhra Pradesh, Telangana and Rajasthan are the main producers of this pulse crop. The yield of this crop continues to be low and fluctuates from year to year even in irrigated areas.

Tur (Arhar)

Tur is the second important pulse crop in the country. It is also known as *red gram* or *pigeon pea*. It is cultivated over marginal lands and under rainfed conditions in the dry areas of central and southern states of the country. This crop occupies only about 2 per cent of total cropped area of India. Maharashtra alone contributes about one-third of the total production of tur. Other leading producer states are Uttar Pradesh, Karnataka, Gujarat and Madhya Pradesh. Per hectare output of this crop is very low and its performance is inconsistent.

Activity

Differentiate between different foodgrains. Mix grains of various kinds and separate cereals from pulses. Also, separate fine from coarse cereals.

Oilseeds

The oilseeds are produced for extracting edible oils. Drylands of Malwa plateau, Marathwada, Gujarat, Rajasthan, Telangana, Rayalseema region of Andhra Pradesh and Karnataka plateau are oilseeds growing regions of India. These crops together occupy about 14 per cent of total cropped area in the country. Groundnut, rapeseed and mustard, soyabean and sunflower are the main oilseed crops grown in India.

Groundnut

India produces about 18.8 per cent of the total groundnut production in the world (2018). It is largely a rainfed *kharif* crop of drylands. But in southern India, it is cultivated during rabi season as well. It covers about 3.6 per cent of total cropped area in the country. Gujarat, Rajasthan, Tamil Nadu, Telangana, Andhra Pradesh, Karnataka and Maharashtra are the leading producers. Yield of groundnut is comparatively high in Tamil Nadu where it is partly irrigated. But its yield is low in Telangana, Andhra Pradesh and Karnataka.

Rapeseed and Mustard

Rapeseed and mustard comprise several oilseeds as *rai, sarson*, *toria* and *taramira*. These are subtropical crops cultivated during rabi season in north-western and central parts of India. These are frost sensitive crops and their yields fluctuate from year to year. But with the expansion of irrigation and improvement in seed technology, their yields have improved and stabilised to some extent. About two-third of the cultivated area under these crops is irrigated. These oilseeds together occupy only about 2.5 per cent of total cropped area in the country. Rajasthan contributes about one-third production while other leading producers are Haryana and Madhya Pradesh. Yields of these crops are comparatively high in Haryana and Rajasthan.

Other Oilseeds

Soyabean and sunflower are other important oilseeds grown in India. Soyabean is mostly grown in Madhya Pradesh and Maharashtra.

Fig. 3.5 : Farmers sowing soyabean seeds in Amravati, Maharashtra

© NCERT not to be republished

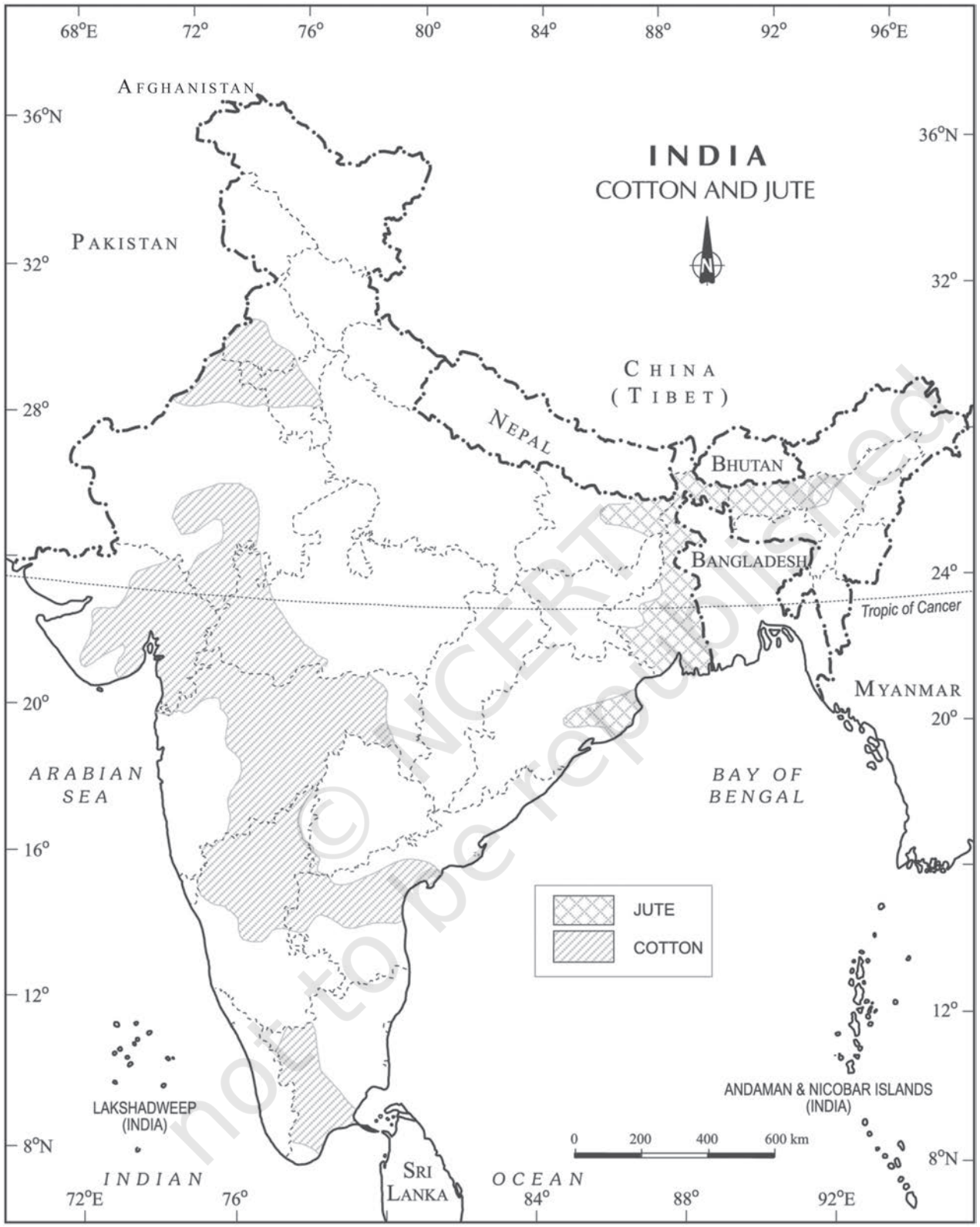


Fig. 3.6 : India – Distribution of Cotton and Jute

© NCERT not to be republished

These two states together produce about 90 per cent of total output of soyabean in the country. Sunflower cultivation is concentrated in Karnataka, Andhra Pradesh, Telangana and adjoining areas of Maharashtra. It is a minor crop in northern parts of the country where its yield is high due to irrigation.

Fibre Crops

These crops provide us fibre for preparing cloth, bags, sacks and a number of other items. Cotton and jute are two main fibre crops grown in India.

Cotton

Cotton is a tropical crop grown in *kharif* season in semi-arid areas of the country. India lost a large proportion of cotton growing area to Pakistan during partition. However, its acreage has increased considerably during the last 50 years. India grows both short staple (Indian) cotton as well as long staple (American) cotton called '*narma*' in north-western parts of the country. Cotton requires clear sky during flowering stage.

Fig. 3.7 : Cotton Cultivation

India ranks second in the world in the production of cotton after China. Cotton occupies about 4.7 per cent of total cropped area in the country. There are three cotton growing areas, i.e. parts of Punjab, Haryana and northern Rajasthan in north-west, Gujarat and Maharashtra in the west and plateaus of Andhra Pradesh, Karnataka and Tamil Nadu in south. Leading producers of this crop are Gujarat, Maharashtra and Telangana Per hectare output of cotton is high under irrigated conditions in north-western region of the country. Its yield is very low in Maharashtra where it is grown under rainfed conditions.

Jute

Jute is used for making coarse cloth, bags, sacks and decorative items. It is a cash crop in West Bengal and adjoining eastern parts of the country. India lost large jute growing areas to East Pakistan (Bangladesh) during partition. At present, India produces about three-fifth of jute production of the world. West Bengal accounts for about three-fourth of the production in the country. Bihar and Assam are other jute growing areas. Being concentrated only in a few states, this crop accounts for only about 0.5 per cent of total cropped area in the country.

Other Crops

Sugarcane, tea and coffee are other important crops grown in India.

Sugarcane

Sugarcane is a crop of tropical areas. Under rainfed conditions, it is cultivated in sub-humid and humid climates. But it is largely an irrigated crop in India. In Indo-Gangetic plain, its cultivation is largely concentrated in Uttar Pradesh. Sugarcane growing area in western India is spread over Maharashtra and Gujarat.

Fig. 3.8 : Sugarcane Cultivation

© NCERT not to be republished

Fig. 3.9 : India – Distribution of Sugarcane

© NCERT not to be republished

In southern India, it is cultivated in irrigated tracts of Karnataka, Tamil Nadu, Telangana and Andhra Pradesh.

India was the second largest producer of sugarcane after Brazil in 2018. It accounts for about 19.7 per cent of the world production of sugarcane. But it occupies only 2.4 per cent of total cropped area in the country. Uttar Pradesh produces about two-fifth of sugarcane of the country. Maharashtra, Karnataka, Tamil Nadu, and Andhra Pradesh are other leading producers of this crop where yield level of sugarcane is high. Its yield is low in northern India.

Tea

Tea is a plantation crop used as beverage. Black tea leaves are fermented whereas green tea leaves are unfermented. Tea leaves have rich content of caffeine and tannin. It is an indigenous crop of hills in northern China. It is grown over undulating topography of hilly areas and well-drained soils in humid and sub-humid tropics and sub-tropics. In India, tea plantation started in 1840s in Brahmaputra valley of Assam which still is a major tea growing area in the country. Later on, its plantation was introduced in the sub-Himalayan region of West Bengal (Darjeeling, Jalpaiguri and Cooch Behar districts). Tea is also cultivated on the lower slopes of Nilgiri and Cardamom hills in Western Ghats. India is a leading producer of tea and accounts for about 21.22 per cent of total production in the world 2018. India's share in the international market of tea has declined substantially. It ranks second among tea exporting countries in the world after China (2018). Assam accounts for about 53.2 per cent of the total cropped area and contributes more than half of total production of tea in the country. West Bengal and Tamil Nadu are the other leading producers of tea.

Fig. 3.10 : Tea Farming

Coffee

Coffee is a tropical plantation crop. Its seeds are roasted, ground and are used for preparing a beverage. There are three varieties of coffee i.e. *arabica*, *robusta* and *liberica*. India mostly grows superior quality coffee, *arabica*, which is in great demand in International market. But India produces only about 3.17 per cent coffee of the world and *ranks eighth* after Brazil, Vietnam, Indonesia, Colombia, Honduras, Ethiopia and Peru in 2018. Coffee is cultivated in the highlands of Western Ghats in Karnataka, Kerala and Tamil Nadu. Karnataka alone accounts for more than two-third of total production of coffee in the country.

Agricultural Development in India

Indian agricultural economy was largely subsistence in nature before Independence. It had dismal performance in the first half of twentieth century. This period witnessed severe droughts and famines. During partition about one-third of the irrigated land in undivided India went to Pakistan. This reduced the proportion of irrigated area in Independent India. After Independence, the immediate goal of the Government was to increase foodgrains production by (i) switching over from cash crops to food crops; (ii) intensification of cropping over already cultivated land; and (iii) increasing cultivated area by bringing cultivable and fallow land under plough. Initially, this strategy helped in increasing foodgrains production. But agricultural production stagnated during late –1950s. To overcome this problem, Intensive Agricultural District Programme (IADP) and Intensive Agricultural Area Programme (IAAP) were launched. But two consecutive droughts during mid-1960s resulted in food crisis in the country. Consequently, foodgrains were imported from other countries.

© NCERT not to be republished

Fig. 3.11 : India – Distribution of Tea and Coffee

© NCERT not to be republished

New seed varieties of wheat (Mexico) and rice (Philippines) known as high yielding varieties (HYVs) were available for cultivation by mid-1960s. India took advantage of this and introduced package technology comprising HYVs, along with chemical fertilisers in irrigated areas of Punjab, Haryana, Western Uttar Pradesh, Andhra Pradesh and Gujarat. Assured supply of soil moisture through irrigation was a basic pre-requisite for the success of this new agricultural technology. This strategy of agricultural development paid dividends instantly and increased the foodgrains production at very fast rate. This spurt of agricultural growth came to be known as '**Green Revolution**'. This also gave fillip to the development of a large number of agro-inputs, agro-processing industries and small-scale industries. This strategy of agricultural development made the country self-reliant in foodgrain production. But Green Revolution was initially confined to irrigated areas only. This led to regional disparities in agricultural development in the country till 1970s, after which the technology spread to the Eastern and Central parts of the country.

The Planning Commission of India focused its attention on the problems of agriculture in rainfed areas in 1980s. It initiated agro-climatic planning in 1988 to induce regionally balanced agricultural development in the country. It also emphasised on the need for diversification of agriculture and harnessing of resources for the development of dairy farming, poultry, horticulture, livestock rearing and aquaculture.

Initiation of the policy of liberalisation and free market economy in 1990s influenced the course of development of Indian agriculture.

National Mission for Sustainable Agriculture (NMSA)

National Mission for Sustainable Agriculture is to make agriculture more productive, sustainable, remunerative and climate resilient by promoting location specific integrated/composite farming systems and to conserve natural resources through appropriate soil and moisture conservation measures. The Government has been promoting organic farming in the country through the scheme such as Paramparagat Krishi Vikas Yojana (PKVY) and Rashtriya Vikas Yojana (RKVY).

Growth of Agricultural Output and Technology

There has been a significant increase in agricultural output and improvement in technology during the last 50 years.

- Production and yield of many crops such as rice and wheat has increased at an impressive rate. Among the other crops, the production of sugarcane, oilseeds and cotton has also increased appreciably.
- Expansion of irrigation has played a crucial role in enhancing agricultural output in the country. It provided basis for introduction of modern agricultural technology, such as high yielding varieties of seeds, chemical fertilisers, pesticides and farm machinery. The net irrigated area in the country has also increased.
- Modern agricultural technology has diffused very fast in various areas of the country. Consumption of chemical fertilizers has increased by 15 times since mid-sixties. Since the high yielding varieties are highly susceptible to pests and diseases, the use of pesticides has increased significantly since 1960s.

Farmer's Portal of India

The Farmer's Portal is a platform for farmers to seek any information related to agriculture. Detailed information on farmers' insurance, agriculture storage, crops, extension activities, seeds, pesticides, farm machineries, etc. is provided. Details of fertilizers, market prices, package and practices, programmes, welfare schemes are also given. Block level details related to soil fertility, storage, insurance, training, etc. are available in an interactive map. Users can also download farm friendly handbook, scheme guidelines, etc.

(Source: https://www.india.gov.in/farmers-portal-india-department-agriculture-and-cooperation)

Problems of Indian Agriculture

The nature of problems faced by Indian agriculture varies according to agro-ecological and historical experiences of its different regions. Hence, most of the agricultural problems in the country are region specific. Yet, there are some problems which are common and range from physical constraints to institutional hindrances. A detailed discussion on these problems follows:

© NCERT not to be republished

Fig. 3.12 : Roto Till Drill—A modern agricultural equipment

Dependence on Erratic Monsoon

Irrigation covers only about 33 per cent of the cultivated area in India. The crop production in rest of the cultivated land directly depends on rain. Poor performance of south-west monsoon also adversely affects the supply of canal water for irrigation. On the other hand, the rainfall in Rajasthan and other drought-prone areas is too meagre and highly unreliable. Even the areas receiving high annual rainfall experience considerable fluctuations. This makes them vulnerable to both droughts and floods. Drought is a common phenomenon in the low rainfall areas, which may also experience occasional floods. The flash floods in drylands of Maharashtra, Gujarat and Rajasthan in 2006 and 2017 are examples of this phenomenon. Droughts and floods continue to be the twin menace in Indian agriculture.

Low productivity

The yield of the crops in the country is low in comparison to the international level. Per hectare output of most of the crops such as rice, wheat, cotton and oilseeds in India is much lower than that of the U.S.A., Russia and Japan. Because of the very high pressure on the land resources, the labour productivity in Indian agriculture is also very low in comparison to international level. The vast rainfed areas of the country, particularly drylands which mostly grow coarse cereals, pulses and oilseeds have low yields.

Why is agricultural productivity low in dry regions?

Constraints of Financial Resources and Indebtedness

The inputs of modern agriculture are very expensive. This resource intensive approach has become unmanageable for marginal and small farmers as they have very meagre or no saving to invest in agriculture. To tide over these difficulties, most of such farmers have resorted to availing credit from various institutions and moneylenders. Crop failures and low returns from agriculture have forced them to fall in the trap of indebtedness.

What are the implications of severe indebtedness? Do you feel that the recent incidents of farmers' suicides in different states of the country are the result of indebtedness?

Lack of Land Reforms

Indian peasantry had been exploited for a long time as there had been unequal distribution of land. Among the three revenue systems operational during British period, i.e., Mahalwari, Ryotwari and Zamindari, the last one was most exploitative for the peasants. After Independence, land reforms were accorded priority, but these reforms were not implemented effectively due to lack of strong political will. Most of the state governments avoided taking politically tough decisions which went against strong political lobbies of landlords. Lack of implementation of land reforms has resulted in continuation of inequitous distribution of cultivable land which is detrimental to agricultural development.

Small Farm Size and Fragmentation of Landholdings

There are a large number of marginal and small farmers in the country. The average size of land holding is shrinking under increasing

© NCERT not to be republished

NITI, agri ministry, FAO launch investment forum for advancing climate resilient agrifood system

PTI - Last Updated: Jan 24, 2024, 06:07:00 PM IST

Synopsis
Delivering the keynote address at the inauguration, NITI Aayog Member Ramesh Chand emphasised on the need for awareness on how agriculture contributes to climate change, citing a contribution of a little more than 13 per cent of the total greenhouse gas emissions in the country.

Reuters

In western UP, sugarcane is life

Avijit Ghosh | TNN

India needs to usher in Green Revolution 2.0 to promote less water-intensive crops: GTRI

PTI - Last Updated: Feb 22, 2024, 12:26:00 PM IST

Synopsis
India needs Green Revolution 2.0 to promote less water-intensive crops, introduce water pricing mechanisms, and address unsustainable practices. Guaranteeing MSP for pulses and oil seeds, promoting eco-friendly farming, and negotiating with WTO are crucial steps.

India needs to usher in Green Revolution 2.0 with a view to promote farming of less water-intensive crops such as pulses and oil seeds and discourage free power for the agri sector, economic think tank GTRI said on Thursday. There is a need to "promote less water-intensive crops like pulses, oil seeds, and vegetables that can significantly reduce water demand and the government can guarantee MSP (minimum support price) on these crops," the Global Trade Research Initiative (GTRI) report said.

What changes have you noticed in agricultural sector and cropping pattern? Discuss in the class.

population pressure. Furthermore, in India, the land holdings are mostly fragmented. There are some states where consolidation of holding has not been carried out even once. Even the states where it has been carried out once, second consolidation is required as land holdings have fragmented again in the process of division of land among the owners of next generations. The small size fragmented landholdings are uneconomic.

Lack of Commercialisation

A large number of farmers produce crops for self-consumption. These farmers do not have enough land resources to produce more than their requirement. Most of the small and marginal farmers grow foodgrains, which are meant for their own family consumption. Modernisation and commercialisation of agriculture have, however, taken place in the irrigated areas.

Vast Underemployment

There is a massive underemployment in the agricultural sector in India, particularly in the unirrigated tracts. In these areas, there is a seasonal unemployment ranging from 4 to 8 months. Even in the cropping season, work is not available throughout as agricultural operations are not labour intensive. Hence, the people engaged in agriculture do not have the opportunity to work round the year.

© NCERT not to be republished

Degradation of Cultivable Land

One of the serious problems that arises out of faulty strategy of irrigation and agricultural development is degradation of land resources. This is serious because it may lead to depletion of soil fertility. The situation is particularly alarming in irrigated areas. A large tract of agricultural land has lost its fertility due to alkalisation and salinisation of soils and waterlogging. Excessive use of chemicals such as insecticides and pesticides has led to their concentration in toxic amounts in the soil profile. Leguminous crops have been displaced from the cropping pattern in the irrigated areas and duration of fallow has substantially reduced owing to multiple cropping. This has obliterated the process of natural fertilization such as nitrogen fixation. Rainfed areas in humid and semi-arid tropics also experience degradation of several types like soil erosion by water and wind erosion which are often induced by human activities.

Activity

Prepare a list of agricultural problems in your own region. How similar or different are these problems compared to the problems mentioned in this chapter?

EXERCISES

1. Choose the right answers of the following from the given options.

(i) Which one of the following is NOT a land-use category?

(a) Fallow land (c) Net Area Sown

(b) Marginal land (d) Culturable Wasteland

(ii) What one of the following is the main reason due to which share of forest has shown an increase in the last forty years?

(a) Extensive and efficient efforts of afforestation

(b) Increase in community forest land

(c) Increase in notified area allocated for forest growth

(d) Better peoples' participation in managing forest area.

(iii) Which one of the following is the main form of degradation in irrigated areas?

(a) Gully erosion (c) Salinisation of soils

(b) Wind erosion (d) Siltation of land

(iv) Which one of the following crops is not cultivated under dryland farming?

(a) Ragi (c) Groundnut

(b) Jowar (d) Sugarcane

(v) In which of the following group of countries of the world, HYVs of wheat and rice were developed?

(a) Japan and Australia (c) Mexico and Philippines

(b) U.S.A. and Japan (d) Mexico and Singapore

© NCERT not to be republished

Reprint 2026-27

2. Answer the following questions in about 30 words.

(i) Differentiate between barren and wasteland and culturable wasteland.

(ii) How would you distinguish between net sown area and gross cropped area?

(iii) Why is the strategy of increasing cropping intensity important in a country like India?

(iv) How do you measure total cultivable land?

(v) What is the difference between dryland and wetland farming?

3. Answer the following questions in about 150 words.

(i) What are the different types of environmental problems of land resources in India?

(ii) What are the important strategies for agricultural development followed in the post-independence period in India?

© NCERT not to be republished

Unit III
Chapter 4

12099CH06

WATER RESOURCES

Do you think that what exists today will continue to be so, or the future is going to be different in some respects? It can be said with some certainty that the societies will witness demographic transition, geographical shift of population, technological advancement, degradation of environment and water scarcity. Water scarcity is possibly to pose the greatest challenge on account of its increased demand coupled with shrinking supplies due to over utilisation and pollution. Water is a cyclic resource with abundant supplies on the globe. Approximately, 71 per cent of the earth's surface is covered with it but freshwater constitutes only about 3 per cent of the total water. In fact, a very small proportion of freshwater is effectively available for human use. The availability of freshwater varies over space and time. The tensions and disputes on sharing and control of this scarce resource are becoming contested issues among communities, regions, and states. The assessment, efficient use and conservation of water, therefore, become necessary to ensure development. In this chapter, we shall discuss water resources in India, its geographical distribution, sectoral utilisation, and methods of its conservation and management.

Water Resources of India

India accounts for about 2.45 per cent of the world's surface area, 4 per cent of the world's water resources and more than 17 per cent of the world's population. The total water available from precipitation in the country in a year is about 4,000 cubic km. The availability from surface water and replenishable groundwater is 1,869 cubic km. Out of this, only 60 per cent can be put to beneficial uses. Thus, the total utilisable water resource in the country is only 1,122 cubic km.

Surface Water Resources

There are four major sources of surface water. These are rivers, lakes, ponds and tanks. In the country, there are about 10,360 rivers and their tributaries longer than 1.6 km each. The mean annual flow in all the river basins

© NCERT not to be republished

in India is estimated to be 1,869 cubic km. However, due to topographical, hydrological and other constraints, only about 690 cubic km (32 per cent) of the available surface water can be utilised. Water flow in a river depends on size of its catchment area or river basin and rainfall within its catchment area. You have studied in your Class XI textbook *"India : Physical Environment"* that precipitation in India has very high spatial variation, and it is mainly concentrated in Monsoon season. You also have studied in the textbook that some of the rivers in the country like the Ganga, the Brahmaputra, and the Indus have huge catchment areas. Given that precipitation is relatively high in the catchment areas of the Ganga, the Brahmaputra and the Barak rivers, these rivers, although account for only about one-third of the total area in the country, have 60 per cent of the total surface water resources. Much of the annual water flow in south Indian rivers like the Godavari, the Krishna, and the Kaveri has been harnessed, but it is yet to be done in the Brahmaputra and the Ganga basins.

Groundwater Resources

The total replenishable groundwater resources in the country are about 432 cubic km. The level of groundwater utilisation is relatively high in the river basins lying in north-western region and parts of south India.

The groundwater utilisation is very high in the states of Punjab, Haryana, Rajasthan, and Tamil Nadu. However, there are States like Chhattisgarh, Odisha, Kerala, etc., which utilise only a small proportion of their groundwater potentials. States like Gujarat, Uttar Pradesh, Bihar, Tripura and Maharashtra are utilising their groundwater resources at a moderate rate. If the present trend continues, the demands for water would need the supplies. And such situation, will be detrimental to development, and can cause social upheaval and disruptions.

Lagoons and Backwaters

India has a vast coastline and the coast is very indented in some states. Due to this, a number of lagoons and lakes have formed. The States like Kerala, Odisha and West Bengal have vast surface water resources in these lagoons and lakes. Although, water is generally brackish in these water bodies, it is used for fishing and irrigating certain varieties of paddy crops, coconut, etc.

Water Demand and Utilisation

India has traditionally been an agrarian economy, and about two-third of its population have been dependent on agriculture. Hence, development of irrigation to increase agricultural production has been assigned a very high priority in the Five Year Plans, and multipurpose river valleys projects, like the Bhakra-Nangal, Hirakud, Damodar Valley, Nagarjuna Sagar, Indira Gandhi Canal Project, etc., have been taken up. In fact, India's water demand at present is dominated by irrigational needs.

Agriculture accounts for most of the surface and groundwater utilisation, it accounts for 89 per cent of the surface water and 92 per cent of the groundwater utilisation. While the share of industrial sector is limited to 2 per cent of the surface water utilisation and 5 per cent of the ground-water, the share of domestic sector is higher (9 per cent) in surface water utilisation as compared to groundwater. The share of agricultural sector in total water utilisation is much higher than other sectors. However, in future, with development, the shares of industrial and domestic sectors in the country are likely to increase.

Demand of Water for Irrigation

In agriculture, water is mainly used for irrigation. Irrigation is needed because of spatio-temporal variability in rainfall in the country. The large tracts of the country are deficient in rainfall and are drought prone. North-western India and Deccan plateau constitute such areas. Winter and summer seasons are more or less dry in most part of the country. Hence, it is difficult to practise agriculture without assured

© NCERT not to be republished

Fig. 4.1 : India – River Basins

© NCERT not to be republished

irrigation during dry seasons. Even in the areas of ample rainfall like West Bengal and Bihar, breaks in monsoon or its failure creates dry spells detrimental for agriculture. Water need of certain crops also makes irrigation necessary. For instance, water requirement of rice, sugarcane, jute, etc. is very high which can be met only through irrigation.

Provision of irrigation makes multiple cropping possible. It has also been found that irrigated lands have higher agricultural productivity than unirrigated land. Further, the high yielding varieties of crops need regular moisture supply, which is made possible only by a developed irrigation systems. In fact, this is why that green revolution strategy of agriculture development in the country has largely been successful in Punjab, Haryana and western Uttar Pradesh.

In Punjab, Haryana and western Uttar Pradesh, more than 85 per cent of their net sown area is under irrigation. Wheat and rice are grown mainly with the help of irrigation in these states. Of the total net irrigated area 76.1 per cent in Punjab and 51.3 per cent in Haryana are irrigated through wells and tubewells. This shows that these states utilise large proportion of their groundwater potential which has resulted in groundwater depletion in these states.

The over-use of groundwater resources has led to decline in groundwater table in these states. In fact, over withdrawals in some states, like Rajasthan and Maharashtra, has increased fluoride concentration in groundwater, and this practice has led to increase in concentration of arsenic in parts of West Bengal and Bihar.

Activity

Intensive irrigation in Punjab, Haryana and western Uttar Pradesh is increasing salinity in the soil and depletion of groundwater irrigation. Discuss its likely impacts on agriculture.

Do You Know ?

Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)

Pradhan Mantri Krishi Sinchayee Yojana has been launched by the Central Government during 2015-16 with an overarching vision to ensure access to some means of protective irrigation for all agricultural farms in the country, thus bringing much desired rural prosperity. Some of the broad objectives of the this programmes are to:

- Enhance the physical access of water on the farm and expand cultivable area under assured irrigation (*Har khet ko pani*)
- Promote integration of water source, distribution and its efficient use, to make best use of water through appropriate technologies and practices.
- Improve on-farm water use efficiency to reduce wastage and increase availability both in duration and exent; irrigation and other water saving technologies (*Per drope more crop*)
- Introduce sustainable water conservation practices
- Ensure the integrated development of rain-fed areas using the waters held approach towards soil and water conservation, regeration of ground water, providing livelihood options, etc.

Emerging Water Problems

The per capita availability of water is dwindling day-by-day due to increase in population. The available water resources are also getting polluted with industrial, agricultural and domestic effluents, and this, in turn, is further limiting the availability of usable water resources.

Deterioration of Water Quality

Water quality refers to purity of water, or water without unwanted foreign substances. Water

© NCERT not to be republished

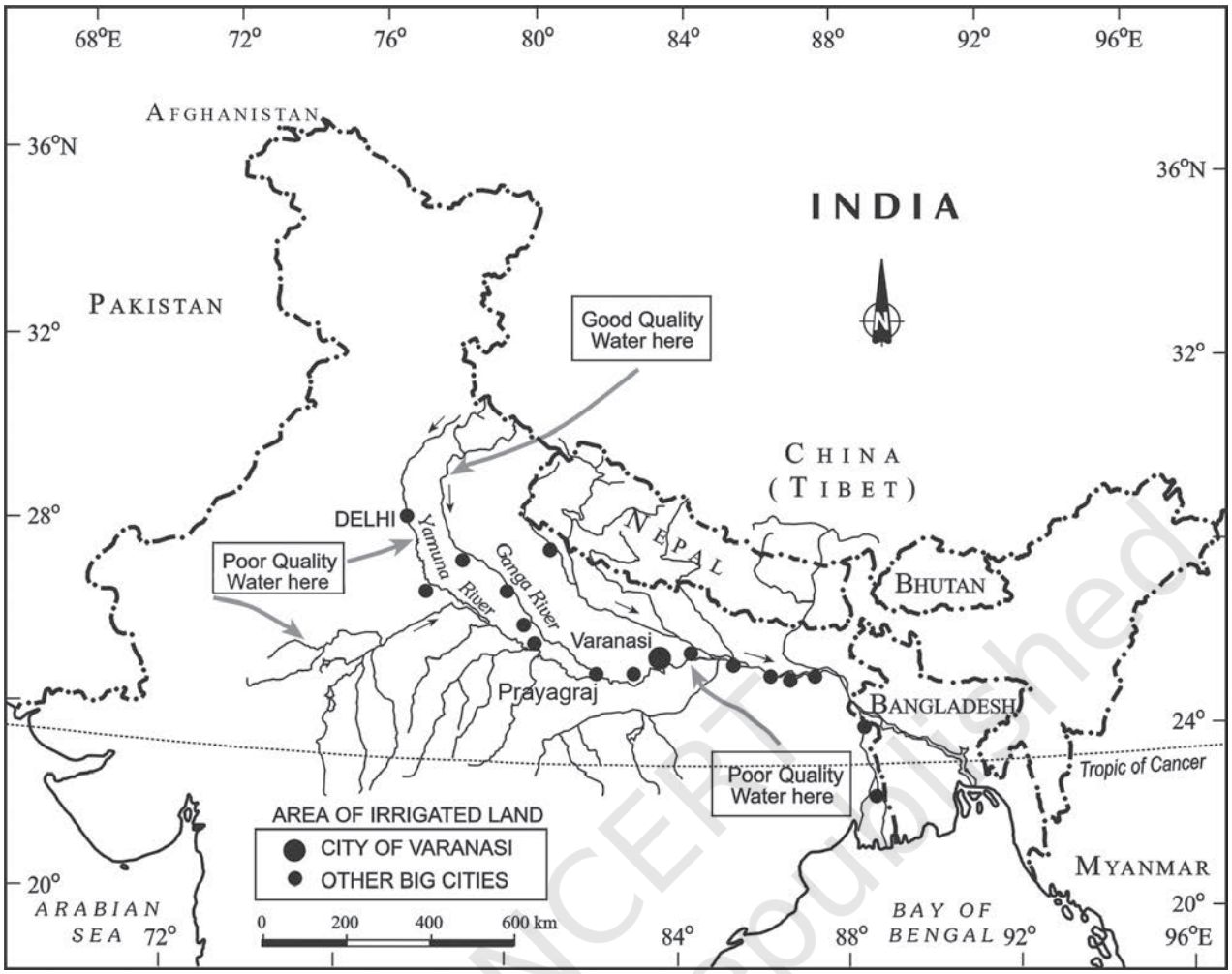


Fig. 4.2 : The Ganga and its Tributaries and Towns Located on them

gets polluted by foreign matters, such as micro-organisms, chemicals, industrial and other wastes. Such matters deteriorate the quality of water and render it unfit for human use. When toxic substances enter lakes, streams, rivers, ocean and other water bodies, they get dissolved or lie suspended in water. This results in pollution of water, whereby quality of water deteriorates affecting aquatic systems. Sometimes, these pollutants also seep down and pollute groundwater.

Activity

Find out which are the major towns/cities located on the bank of the Ganga and its tributaries and major industries they have.

Water Conservation and Management

Since there is a declining availability of freshwater and increasing demand, the need has arisen to conserve and effectively manage this precious life giving resource for sustainable development. Given that water availability from sea/ocean, due to high cost of desalinisation, is considered negligible, India has to take quick steps and make effective policies and laws, and adopt effective measures for its conservation. Besides developing water-saving technologies and methods, attempts are also to be made to prevent the pollution. There is need to encourage watershed development, rainwater harvesting, water recycling and reuse, and

© NCERT not to be republished

conjunctive use of water for sustaining water supply in long run.

Prevention of Water Pollution

Available water resources are degrading rapidly. The major rivers of the country generally retain better water quality in less densely populated upper stretches in hilly areas. In plains, river water is used intensively for irrigation, drinking, domestic and industrial purposes. The drains carrying agricultural (fertilizers and insecticides), domestic (solid and liquid wastes), and industrial effluents join the rivers. The concentration of pollutants in rivers, especially remains very high during the summer season when flow of water is low.

The Central Pollution Control Board (CPCB) in collaboration with State Pollution Control Boards has been monitoring water quality of national aquatic resources at 507 stations. The data obtained from these stations show that organic and bacterial contamination continues to be the main source of pollution in rivers. The Yamuna river is the most polluted river in the country between Delhi and Etawah. Other severely polluted rivers are: the Sabarmati at Ahmedabad, the Gomti at Lucknow, the Kali, the Adyar, the Coum (entire stretches), the Vaigai at Madurai and the Musi of Hyderabad and the Ganga at Kanpur and Varanasi. Groundwater pollution has occurred due to high concentrations of heavy/toxic metals, fluoride and nitrates at different parts of the country.

The legislative provisions such as the Water (Prevention and Control of Pollution) Act 1974, and Environment Protection Act 1986 have not been implemented effectively. The result is that in 1997, 251 polluting industries were located along the rivers and lakes. The Water

Rivers of conflict...but also of peace

Water has been known for centuries to be a major cause of tension and conflict—within countries, as well as among nations. Yet while its propensity to strain relations frequently makes headlines, the other side of the coin—water as an agent of cooperation—rarely gets sufficient attention.

With more than the 260 water basins in the world transcending national borders, it is hardly surprising that the situation is widely seen as being fodder for hostility.

Nevertheless, research has shown much more historical evidence of water as a catalyst for cooperation rather than a trigger of conflict. There are more than

There have been more than 500 conflicts over water in the past century, but it's also an agent of cooperation

ALL WELL? There are more than 3,800 declarations or conventions on water, including 286 treaties

3,800 unilateral, bilateral or multilateral declarations or conventions on water 286 are treaties, with 61 referring to over 200 international river basins.

There are examples of workable accords on water reached even by states that were in conflict over other matters like India and Pakistan, Israel and Jordan. Another example is that of the Northern Aral Sea, shared by Kazakhstan and Uzbekistan. It is being successfully restored after its surface has shrunk to less than half its original size as a result of a massive diversion of water under the Soviet Union, which has drained the two rivers feeding it and devastated the surrounding environment.

Rich countries poor in supply of water: WWF

Geneva: Rich countries have to make drastic changes to policies if they are to avoid the water crisis that is facing poorer nations, environmental organisation WWF said on Wednesday.

In a survey of the situation across the industrialised world, it said many cities were already losing the battle to maintain water supplies as governments talked about conservation but failed to implement their pledges.

has been very difficult."

In Europe, the report said, countries around the Atlantic are suffering from recurring droughts, while in the Mediterranean region water resources were being depleted by the boom in tourism and irrigated agriculture.

In Australia, already the driest continent, salinity had become a major threat to a large proportion of key farming areas, while in the US wide areas were using substantially more water than could be replenished.

Even in Japan with its high rainfall, contamination of water supplies had become a serious issue.

Climate change? Barmer grapples with floods

AND THEY SAY IT'S A DESERT

In the Times of Adversity : A woman carries her child to safety in the flooded Kudla village of Rajasthan's Barmer district

A-prone Barmer?

Ashwani Vyas

place in Barmer, 500 people in such support from all walks of

place in Barmer, 500 people in the region died of falsciparium malaria. The state government's health department is yet to wake up to the situation.

Ironically, this is the same region where the much-touted Indira Canal cuts a greening swathe across the desert, but brings its own share of woes. The waters that were to bloom the desert, have also led to a change in eco-system of the desert. Large parts of it have turned marshy and in some places, soil salinity has changed, leading to problems like water-logging, say experts.

SURVIVAL INSTINCT

ater Woes : A father carries his son to safety as he es through floodwater, after a three-day spell of dy rain in Dhantala village, near Siliguri

Discuss the issues highlighted in the news items.

Reprint 2026-27

Cess Act, 1977, meant to reduce pollution has also made marginal impacts. There is a strong need to generate public awareness about importance of water and impacts of water pollution. The public awareness and action can be very effective in reducing the pollutants from agricultural activities, domestic and industrial discharges.

Recycle and Reuse of Water

Another way through which we can improve fresh water availability is by recycle and reuse. Use of water of lesser quality such as reclaimed wastewater would be an attractive option for industries for cooling and fire fighting to reduce their water cost. Similarly, in urban areas water after bathing and washing utensils can be used for gardening. Water used for washing vehicle can also be used for gardening. This would conserve better quality of water for drinking purposes. Currently, recycling of water is practised on a limited scale. However, there is enormous scope for replenishing water through recycling.

Activity

Observe the quantity of water used at your home in various activities and enlist the ways in which the water can be reused and recycled in various activities.

Class teachers should organise a discussion on recycle and reuse of water.

Watershed Management

Watershed management basically refers to efficient management and conservation of surface and groundwater resources. It involves prevention of runoff and storage and recharge of groundwater through various methods like percolation tanks, recharge wells, etc. However, in broad sense watershed management includes conservation, regeneration and judicious use of all resources – natural (like land, water, plants and animals) and human with in a watershed. Watershed management aims at bringing about balance between natural resources on the one hand and society on the other. The success of watershed development largely depends upon community participation.

The Central and State Governments have initiated many watershed development and management programmes in the country. Some of these are being implemented by non-governmental organisations also. ***Haryali*** is a watershed development project sponsored by the Central Government which aims at enabling the rural population to conserve water for drinking, irrigation, fisheries and afforestation. The Project is being executed by Gram Panchayats with people's participation.

Do You Know ?

Atal Bhujal Yojana (Atal Jal) is being implemented in 8220 water stressed Gram Panchayats of 229 administrative blocks/ talukas in 80 districts of seven states,viz. Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, and Uttar Pradesh. The selected States account for about 37 per cent of the total number of water-stressed (over-exploited, critical and semi-critical) blocks in India. One of the key aspects of ATAL JAL is to bring in behavioural changes in the community, from the prevailing attitude of consumption to conservation and smart water management. (Source: *Annual Report, Ministry of Jal Shakti, Govt. of India, 2022-23*)

Neeru-Meeru (Water and You) programme (in Andhra Pradesh) and ***Arvary Pani Sansad*** (in Alwar, Rajasthan) have taken up constructions of various water-harvesting structures such as percolation tanks, dug out ponds (***Johad***), check dams, etc., through people's participation. Tamil Nadu has made water harvesting structures in the houses compulsory. No building can be constructed without making structures for water harvesting.

Watershed development projects in some areas have been successful in

© NCERT not to be republished

Watershed Development in Ralegan Siddhi, Ahmadnagar, Maharashtra: A Case Study

Ralegan Siddhi is a small village in the district of Ahmadnagar, Maharashtra. It has become an example for watershed development throughout the country.

In 1975, this village was caught in a web of poverty and illicit liquor trade. The transformation took place when a retired army personnel, settled down in the village and took up the task of watershed development. He convinced villagers about the importance of family planning and voluntary labour; preventing open grazing, felling trees, and liquor prohibition.

Voluntary labour was necessary to ensure minimum dependence on the government for financial aids. "It socialised the costs of the projects." explained the activist. Even those who were working outside the village contributed to the development by committing a month's salary every year.

Work began with the percolation tank constructed in the village. In 1975, the tank could not hold water. The embankment wall leaked. People voluntarily repaired the embankment. The seven wells below it swelled with water in summer for the first time in the living memory of the people. The people reposed their faith in him and his visions.

A youth group called Tarun Mandal was formed. The group worked to ban the dowry system, caste discrimination and untouchability. Liquor distilling units were removed and prohibition imposed. Open grazing was completely banned with a new emphasis on stall-feeding. The cultivation of water-intensive crops like sugarcane was banned. Crops such as pulses, oilseeds and certain cash crops with low water requirements were encouraged.

All elections to local bodies began to be held on the basis of consensus. "It made the community leaders complete representatives of the people." A system of Nyay Panchayats (informal courts) were also set up. Since then, no case has been referred to the police.

Ralegan Siddhi before mitigation approach

A Rs.22 lakh school building was constructed using only the resources of the village. No donations were taken. Money, if needed, was borrowed and paid back. The villagers took pride in this self-reliance. A new system of sharing labour grew out of this infusion of pride and voluntary spirit. People volunteered to help each other in agricultural operation. Landless labourers also gained employment. Today the village plans to buy land for them in adjoining villages.

Ralegan Siddhi after mitigation approach

At present, water is adequate; agriculture is flourishing, though the use of fertilisers and pesticides is very high. The prosperity also brings the question of ability of the present generation to carry on the work after the leader of the movement who declared that, "The process of Ralegan's evolution to an ideal village will not stop. With changing times, people tend to evolve new ways. In future, Ralegan might present a different model to the country."

What a mitigation approach can do? A success story.

© NCERT not to be republished

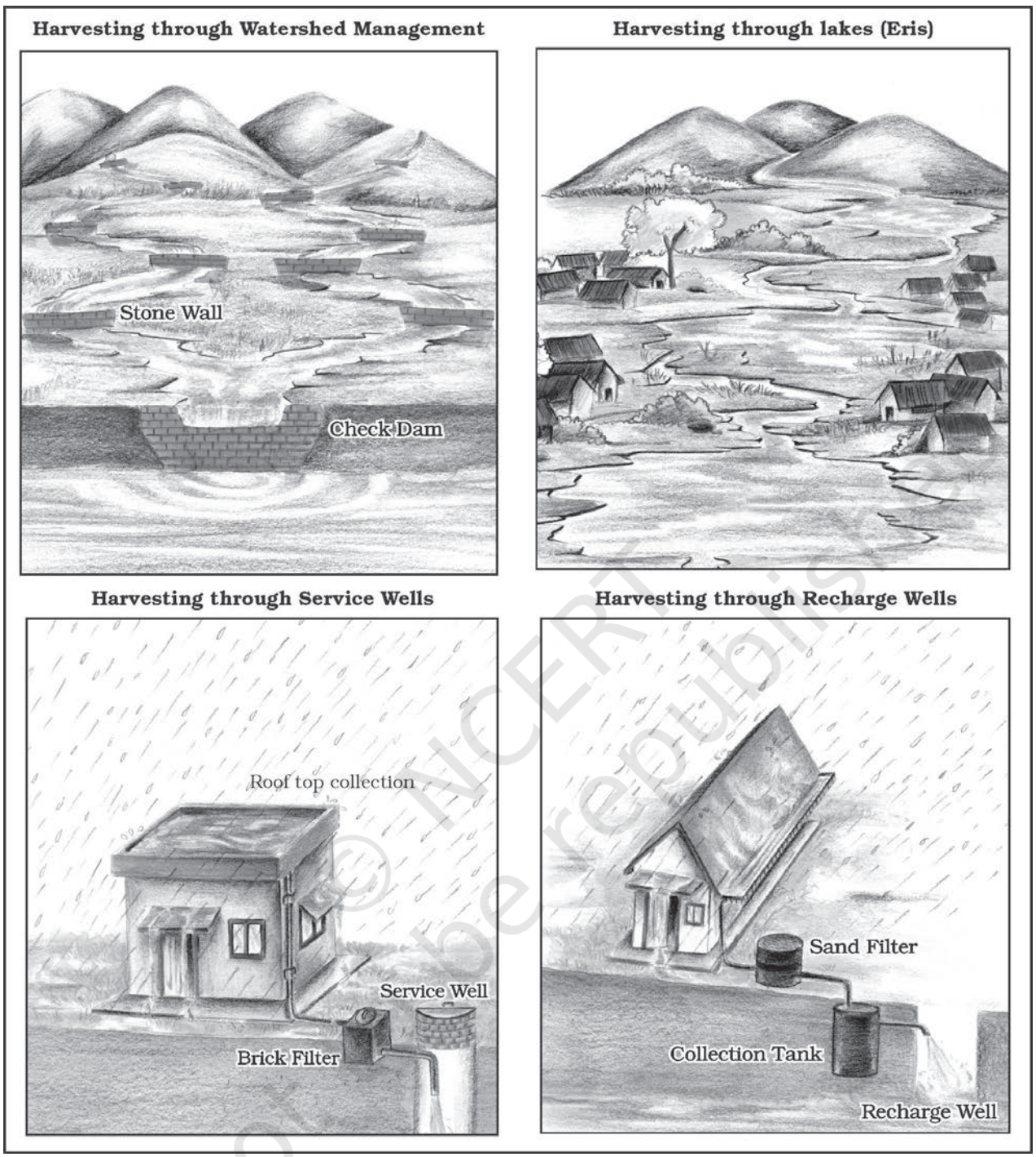


Fig. 4.3 : Various Methods of Rainwater Harvesting

rejuvenating environment and economy. However, there are only a few success stories. In majority of cases, the programme is still in its nascent stage. There is a need to generate awareness regarding benefits of watershed development and management among people in the country, and through this integrated water resource management approach water availability can be ensured on sustainable basis.

© NCERT not to be republished

Rainwater Harvesting

Rainwater harvesting is a method to capture and store rainwater for various uses. It is also used to recharge groundwater aquifers. It is a low cost and eco-friendly technique for preserving every drop of water by guiding the rain water to borewell, pits and wells. Rainwater harvesting increases water availability, checks the declining groundwater table, improves the quality of groundwater through dilution of contaminants, like fluoride and nitrates, prevents soil erosion, and flooding and arrests salt water intrusion in coastal areas if used to recharge aquifers.

Rainwater harvesting has been practised through various methods by different communities in the country for a long time. Traditional rainwater harvesting in rural areas is done by using surface storage bodies, like lakes, ponds, irrigation tanks, etc. In Rajasthan, rainwater harvesting structures locally known as ***Kund*** or ***Tanka*** (a covered underground tank) are constructed near or in the house or village to store harvested rainwater (see Fig. 4.3 to understand various ways of rainwater harvesting).

There is a wide scope to use rainwater harvesting technique to conserve precious water resource. It can be done by harvesting rainwater on rooftops and open spaces. Harvesting rainwater also decreases the community dependence on groundwater for domestic use. Besides bridging the demand-supply gap, it can also save energy to pump groundwater as recharge leads to rise in groundwater table. These days rainwater harvesting is being taken up on massive scale in many states in the country. Urban areas can specially benefit from rainwater harvesting as water demand has already outstripped supply in most of the cities and towns.

Apart from the above mentioned factors, the issue desalinisation of water particularly in coastal areas and brackish water in arid and semi-arid areas, transfer of water from water surplus areas to water deficit areas through inter-linking of rivers can be important remedies for solving water problem in India (read more about inter linking of rivers). However, the most important issue from the point of view of individual users, household and communities is pricing of water.

Highlights of India's National Water Policy 2012

The objective of the National Water Policy, 2012 is to assess the existing situation and to propose a framework for a plan of action with a unified national perspective. In order to achieve the objective of the Policy, a number of recommendations have been made therein for conservation, development and improved management of water resources of the country.

Some of the salient features of national water policy 2012 are:

- Emphasis on the need for a national water framework law, comprehensive legislation for optimum development of inter-State rivers and river valleys.
- Water, after meeting the pre-emptive needs for safe drinking water and sanitation, achieving food security, supporting poor people dependent on agriculture for their livelihood and high priority allocation for minimum eco-system needs, be treated as economic good so as to promote its conservation and efficient use.
- Adaptation strategies in view of climate change for designing and management of water resources structures and review of acceptability criteria has been emphasized.
- A system to evolve benchmarks for water uses for different purposes, i.e., water footprints, and water auditing be developed to ensure efficient use of water.
- Removal of large disparity in stipulations for water supply in urban areas and in rural areas has been recommended.
- Water resources projects and services should be managed with community participation.

Source: Press Information Bureau, Govt. of India, Ministry of Water Resources.

© NCERT not to be republished

Jal Kranti Abhiyan (2015-16)

Water is a recyclable resource but its availability is limited and the gap between supply and demand will be widening over time. Climate change at the global scale will be creating water stress conditions in many regions of the world. India has a unique situation of high population growth and rapid economic development with high water demand. The *Jal Kranti Abhiyan* launched by the Government of India in 2015–16 with an aim to ensure water security through per capita availability of water in the country. People in different regions of India had practised the traditional knowledge of water conservation and management to ensure water availability.

The *Jal Kranti Abhiyan* aims at involving local bodies, NGOs and cititzens, at large, in creating awareness regarding its objectives. The following activities have been proposed under the *Jal Kranti Abhiyan*:

1. Selection of one water stressed village in each 672 districts of the country to create a 'Jal Gram'.
2. Ídentification of model command area of about 1000 hectares in different parts of the country, for example, UP, Haryana (North), Karnataka, Telangana, Tamil Nadu (South), Rajasthan, Gujarat (West), Odisha (East), Meghalaya (North-East).
3. Abatement of pollution:
   - Water conservation and artificial recharge.
   - Reducing groundwater pollution.
   - Construction of Arsenic-free wells in selected areas of the country.
4. Creating mass awareness through social media, radio, TV, print media, poster and essay writing competitions in schools.

Jal Kranti Abhiyan is designed to provide livelihood and food security through water security.

© NCERT not to be republished

EXERCISES

1. Choose the right answers of the following from the given options.

(i) Which one of the following types describes water as a resource?

(a) Abiotic resource (c) Biotic Resource

(b) Non-renewable Resources (d) Non-cyclic Resource

(ii) Which one of the following south Indian states has the highest groundwater utilisation (in per cent) of its total ground water potential?

(a) Tamil Nadu (c) Andhra Pradesh

(b) Karnataka (d) Kerala

Reprint 2026-27

(iii The highest proportion of the total water used in the country is in which one of the following sectors?

(a) Irrigation
(b) Industries
(c) Domestic use
(d) None of the above

2. Answer the following questions in about 30 words.

(i) It is said that the water resources in India have been depleting very fast. Discuss the factors responsible for depletion of water resources?

(ii) What factors are responsible for the highest groundwater development in the states of Punjab, Haryana, and Tamil Nadu?

(iii) Why the share of agricultural sector in total water used in the country is expected to decline?

(iv) What can be possible impacts of consumption of contaminated/unclean water on the people?

3. Answer the following questions in about 150 words.

(i) Discuss the availability of water resources in the country and factors that determine its spatial distribution?

(ii) The depleting water resources may lead to social conflicts and disputes. Elaborate it with suitable examples?

(iii) What is watershed management? Do you think it can play an important role in sustainable development?

© NCERT not to be republished

Unit III
Chapter 5

12099CH07

MINERAL AND ENERGY RESOURCES

India is endowed with a rich variety of mineral resources due to its varied geological structure. Bulk of the valuable minerals are products of pre-palaezoic age (Refer: Chapter 2 of Class XI, Textbook: *"Fundamentals of Physical Geography"* and are mainly associated with metamorphic and igneous rocks of the peninsular India. The vast alluvial plain tract of north India is devoid of minerals of economic use. The mineral resources provide the country with the necessary base for industrial development. In this chapter, we shall discuss the availability of various types of mineral and energy resources in the country.

A mineral is a natural substance of organic or inorganic origin with definite chemical and physical properties.

Types of Mineral Resources

On the basis of chemical and physical properties, minerals may be grouped under two main categories of metallics and non-metallics which may further be classified as follows :

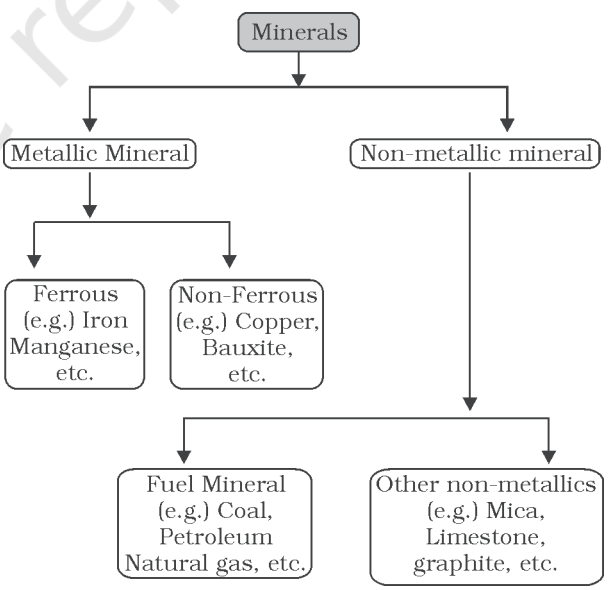


Fig. 5.1 : Classification of Minerals

© NCERT not to be republished

As, it is clear from the Fig. 5.1 metallic minerals are the sources of metals. Iron ore, copper, gold produce metal and are included in this category. Metallic minerals are further divided into ferrous and non-ferrous metallic minerals. Ferrous, as you know, refers to iron. All those minerals which have iron content are ferrous such as iron ore itself and those which do not have iron content are non-ferrous such as copper, bauxite, etc.

Non-metallic minerals are either organic in origin such as fossil fuels also known as mineral fuels which are derived from the buried animal and plant life such as coal and petroleum. Other type of non-metallic minerals are inorganic in origin such as mica, limestone and graphite, etc.

Minerals have certain characteristics. These are unevenly distributed over space. There is inverse relationship in quality and quantity of minerals i.e. good quality minerals are less in quantity as compared to low quality minerals. The third main characteristic is that all minerals are exhaustible over time. These take long to develop geologically and they cannot be replenished immediately at the time of need. Thus, they have to be conserved and not misused as they do not have the second crop.

Distribution of Minerals in India

Most of the metallic minerals in India occur in the peninsular plateau region in the old crystalline rocks. Over 97 per cent of coal reserves occur in the valleys of Damodar, Sone, Mahanadi and Godavari. Petroleum reserves are located in the sedimentary basins of Assam, Gujarat and Mumbai High i.e. off-shore region in the Arabian Sea. New reserves have been located in the Krishna-Godavari and Kaveri basins. Most of the major mineral resources occur to the east of a line linking Mangaluru and Kanpur.

Minerals are generally concentrated in three broad belts in India. There may be some sporadic occurrences here and there in isolated pockets. These belts are :

The North-Eastern Plateau Region

This belt covers Chhotanagpur (Jharkhand), Odisha Plateau, West Bengal and parts of Chhattisgarh. Have you ever thought about the reason of major iron and steel industry being located in this region? It has variety of minerals viz. iron ore coal, manganese, bauxite, mica.

Find out the specific region where these minerals are being extracted.

The South-Western Plateau Region

This belt extends over Karnataka, Goa and contiguous Tamil Nadu uplands and Kerala. This belt is rich in ferrous metals and bauxite. It also contains high grade iron ore, manganese and limestone. This belt lacks in coal deposits except Neyveli lignite.

This belt does not have as diversified mineral deposits as the north-eastern belt. Kerala has deposits of monazite and thorium, bauxite clay. Goa has iron ore deposits.

The North-Western Region

This belt extends along Aravali in Rajasthan and part of Gujarat and minerals are associated with Dharwar system of rocks. Copper, zinc have been major minerals. Rajasthan is rich in building stones i.e. sandstone, granite, marble. Gypsum and Fuller's earth deposits are also extensive. Dolomite and limestone provide raw materials for cement industry. Gujarat is known for its petroleum deposits. You may be knowing that Gujarat and Rajasthan both have rich sources of salt.

Why and where Dandi March was organised by Mahatma Gandhi?

The Himalayan belt is another mineral belt where copper, lead, zinc, cobalt and tungsten are known to occur. They occur on both the eastern and western parts. Assam valley has

© NCERT not to be republished

mineral oil deposits. Besides oil resources are also found in off-shore-areas near Mumbai Coast (Mumbai High).

In the following pages you will find the spatial pattern of some of the important minerals.

Ferrous Mineral

Ferrous minerals such as iron ore, manganese, chromite, etc., provide a strong base for the development of metallurgical industries. Our country is well-placed in respect of ferrous minerals both in reserves and production.

Iron Ore

India is endowed with fairly abundant resources of iron ore. It has the largest reserve of iron ore in Asia. The two main types of ore found in our country are *haematite* and *magnetite*. It has great demand in international market due to its superior quality. The iron ore mines occur in close proximity to the coal fields in the north-eastern plateau region of the country which adds to their advantage.

About 95 per cent of total reserves of iron ore is located in the States of Odisha, Jharkhand, Chhattisgarh, Karnataka, Goa, Telangana, Andhra Pradesh and Tamil Nadu. In Odisha, iron ore occurs in a series of hill ranges in Sundergarh, Mayurbhanj and Jhar. The important mines are Gurumahisani, Sulaipet, Badampahar (Mayurbhaj), Kiruburu (Kendujhar) and Bonai (Sundergarh). Similar hill ranges, Jharkhand has some of the oldest iron ore mines and most of the iron and steel plants are located around them. Most of the important mines such as Noamundi and Gua are located in Poorbi and Pashchimi Singhbhum districts. This belt further extends to Durg, Dantewara and Bailadila. Dalli, and Rajhara in Durg are the important mines of iron ore in the country. In Karnataka, iron ore deposits occur in Sandur-Hospet area of Ballari district, Baba Budan hills and Kudremukh in Chikkamagaluru district and

Iron ore mining gets a boost

The iron ore mining industry in India is attracting several new players, both large and small

Any industrialised nation requires vast quantities of iron ore, which is the basic raw material from which iron and steel are made. India is no exception, and its development over the past few decades has necessitated huge reserves of iron and steel. Iron ore is produced in approximately 46 countries, and world resources are estimated to exceed 800 billion tons of crude ore containing more than 230 billion tons of iron. While Brazil and China are world leaders in iron ore production and consumption, India ranks sixth in terms of iron ore deposits. Interestingly however, India's per capita mineral consumption is one of the lowest in the world.

The Indian ferrous industry can be divided into ore miners and producers. Ore miners are engaged in mining activities to extract the ore, largely for the use of producers. Key players include National Mineral Development Corporation (NMDC), Kudremukh Iron Ore Co (KIOCL), Essel Mining & Industries Ltd, and Sesa Goa (Sesa). Other players like the Belgaum based PVG group which has tied up with the Kolhapur-based Ghodawat Group to form Star PVG exports are also making a mark. Iron ore mines are mostly located in Jharkhand, Orissa, West Bengal, Chattisgarh and Karnataka. Recently however, some Indian steel manufacturing companies have invested in steel and coal mines abroad, such as in Australia.

Producers are classified into main or integrated producers, and ot[illegible] grated producers account [illegible] crude steel production in [illegible] jor integrated steel produc[illegible] ity of India Ltd (SAIL), Ra[illegible] Limited (RINL), and TIS[illegible] the best-known private sector companies in the country. Companies like SAIL and TISCO have their own captive mines. The other or secondary producers include re-rollers and stand alone producers in the organised and unorganised segments, and account for the remaining 33% of India's steel production. Producers are also classified on the basis of the production process and the type of products (long or flat) manufactured by the producers.

Stand alone producers produce sponge iron and pig iron to be used by the main producers. India is the largest producer of coal based sponge iron in the world, and accounts for 15% of the global output. Jindal Steel & Power Ltd. is the largest producer of coal based sponge iron in India - it is also the second largest in the world - with a capacity of 650,000 TPA. KIOCL, Sesa Goa and Usha Ispat are the major producers of pig iron. Integrated steel plants like SAIL and RINL also produce a significant amount of pig iron.

While iron ore is a major component of the steel manufacturing process, scrap is often used to supplement it, though it is in relative-[illegible] rect indicators of iron ore consumption than crude steel. However, imports of iron ore are not a direct indicator of a change in iron ore consumption in any country that produces iron ore.

The Government of India has taken several steps to promote the growth of the mineral sector under the overall framework of the National Mineral Policy, 1993. The amended Mines and Minerals (Development and Regulation) Act (MMDR Act) is aimed at attractin[g] private investment and foreign direct investment (FDI) into the sector. It is estimated tha[t] the production of iron ore during the termina[l] year of the Tenth Plan (2006-07) will touch 110 mt, with around 40 mt exported annually during the Plan period. The Government also regulates the amount of iron ore to be extracted to counter pollution. Modern excavation heavy blasting techniques have been developed which help minimise damage to the environment.

Export of high-grade iron ore has been so far channeled through the Minerals and Metals Trading Corporation Ltd. (MMTC), and quantitative restrictions were imposed by the Government to ensure that indigenous demand was met before any surplus could be exported. However a shift in this policy is expected.

With the number of end user industries in India growing at a significant rate, the production of steel based products is [illegible] prospect, drawing a larg[illegible]

Can you find out its reason?

parts of Shivamogga, Chitradurg and Tumakuru districts. The districts of Chandrapur, Bhandara and Ratnagiri in Maharashtra, Karimnagar and Warangal district of Telangana, Kurnool, Cuddapah and Anantapur districts of Andhra Pradesh, Salem and Nilgiris districts of Tamil Nadu are other iron mining regions. Goa has also emerged as an important producer of iron ore.

Manganese

Manganese is an important raw material for smelting of iron ore and also used for manufacturing ferro alloys. Manganese deposits are found in almost all geological formations, however, it is mainly associated with Dharwar system.

Madhya Pradesh and Odisha are the leading producers of Manganese. Major mines in Odisha are located in the central part of the iron ore belt of India, particularly in Bonai, Kendujhar, Sundergarh, Gangpur, Koraput, Kalahandi and Bolangir.

Reprint 2026-27

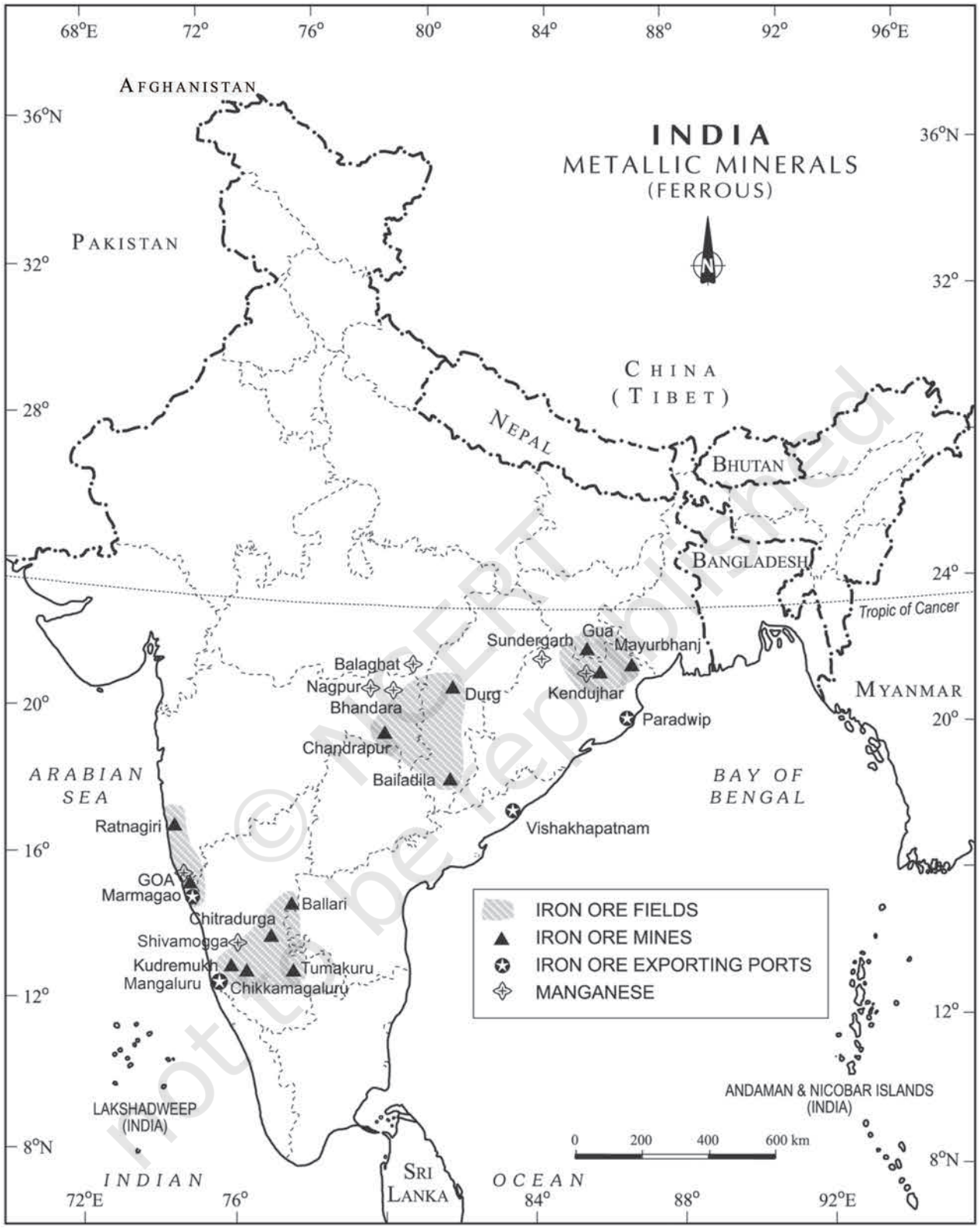


Fig. 5.2 : India – Metallic Minerals (Ferrous)

© NCERT not to be republished

The manganese belt of Madhya Pradesh extends in a belt in Balaghat-Chhindwara-Nimar-Mandla and Jhabua districts. Karnataka is another major producer and here the mines are located in Dharwar, Ballari, Belagavi, North Canara, Chikkmagaluru, Shivamogga, Chitradurg and Tumakuru. Maharashtra is also an important producer of manganese, which is mined in Nagpur, Bhandara and Ratnagiri districts. The disadvantage to these mines is that they are located far from steel plants.

Telangana, Goa, and Jharkhand are other minor producers of manganese.

Non-Ferrous Minerals

India is poorly endowed with non-ferrous metallic minerals except bauxite.

Bauxite

Bauxite is the ore, which is used in manufacturing of aluminium. Bauxite is found mainly in tertiary deposits and is associated with laterite rocks occurring extensively either on the plateau or hill ranges of peninsular India and also in the coastal tracts of the country.

Odisha happens to be the largest producer of Bauxite. Kalahandi and Sambalpur are the leading producers. The other two areas which have been increasing their production are Bolangir and Koraput. The patlands of Lohardaga in Jharkhand have rich deposits. Gujarat, Chhattisgarh, Madhya Pradesh and Maharashtra are other major producers. Bhavanagar, and Jamnagar in Gujarat have the major deposits. Chhattisgarh has bauxite deposits in Amarkantak plateau while Katni-Jabalpur area and Balaghat in M.P. have important deposits of bauxite. Kolaba, Thane, Ratnagiri, Satara, Pune and Kolhapur in Maharashtra are important producers. Tamil Nadu, Karnataka and Goa are minor producers of bauxite.

Copper

Copper is an indispensable metal in the electrical industry for making wires, electric motors, transformers and generators. It is alloyable, malleable and ductile. It is also mixed with gold to provide strength to jewellery.

The Copper deposits mainly occur in Singhbhum district in Jharkhand, Balaghat district in Madhya Pradesh and Jhunjhunu and Alwar districts in Rajasthan.

Minor producers of Copper are Agnigundala in Guntur District (Andhra Pradesh), Chitradurg and Hasan districts (Karnataka) and South Arcot district (Tamil Nadu).

Non-metallic Minerals

Among the non-metallic minerals produced in India, mica is the important one. The other minerals extracted for local consumption are limestone, dolomite and phosphate.

Mica

Mica is mainly used in the electrical and electronic industries. It can be split into very thin sheets which are tough and flexible. Mica in India is produced in Jharkhand, Andhra Pradesh, Telanganga and Rajasthan followed by Tamil Nadu, West Bengal and Madhya Pradesh. In Jharkhand, high quality mica is obtained in a belt extending over a distance of about 150 km, in length and about 22 km, in width in lower Hazaribagh plateau. In Andhra Pradesh, Nellore district produces the best quality mica. In Rajasthan, mica belt extends for about 320 kms from Jaipur to Bhilwara and around Udaipur. Mica deposits also occur in Mysuru and Hasan districts of Karanataka, Coimbatore, Tiruchirapalli, Madurai and Kanniyakumari in Tamil Nadu, Alleppey in Kerala, Ratnagiri in Maharashtra, Purulia and Bankura in West Bengal.

Energy Resources

Mineral fuels are essential for generation of power, required by agriculture, industry, transport and other sectors of the economy. Mineral fuels like coal, petroleum and natural gas (known as fossil fuels), nuclear energy minerals, are the conventional sources of energy. These conventional sources are exhaustible resources.

Reprint 2026-27

Fig. 5.3 : India – Minerals (Non-Ferrous)

© NCERT not to be republished

Coal

Coal is a one of the important minerals which is mainly used in the generation of thermal power and smelting of iron ore. Coal occurs in rock sequences mainly of two geological ages, namely Gondwana and tertiary deposits.

About 80 per cent of the coal deposits in India is of bituminous type and is of non-coking grade. The most important Gondwana coal fields of India are located in Damodar Valley. They lie in Jharkhand-Bengal coal belt and the important coal fields in this region are Raniganj, Jharia, Bokaro, Giridih, Karanpura.

Jharia is the largest coal field followed by Raniganj. The other river valleys associated with coal are Godavari, Mahanadi and Sone. The most important coal mining centres are Singrauli in Madhya Pradesh (part of Singrauli coal field lies in Uttar Pradesh), Korba in Chhattisgarh, Talcher and Rampur in Odisha, Chanda–Wardha, Kamptee and Bander in Maharashtra and Singareni in Telangana and Pandur in Andhra Pradesh.

Tertiary coals occur in Assam, Arunachal Pradesh, Meghalaya and Nagaland. It is extracted from Darangiri, Cherrapunji, Mewlong and Langrin (Meghalaya); Makum, Jaipur and Nazira in upper Assam, Namchik – Namphuk (Arunachal Pradesh) and Kalakot (Jammu and Kashmir).

Besides, the brown coal or lignite occur in the coastal areas of Tamil Nadu, Puducherry, Gujarat and Jammu and Kashmir.

Petroleum

Crude petroleum consists of hydrocarbons of liquid and gaseous states varying in chemical composition, colour and specific gravity. It is an essential source of energy for all internal combustion engines in automobiles, railways and aircraft. Its numerous by-products are processed in petrochemical industries, such as fertiliser, synthetic rubber, synthetic fibre, medicines, vaseline, lubricants, wax, soap and cosmetics.

Do You Know ?

Petroleum is referred to as liquid gold because of its scarcity and diversified uses.

Crude petroleum occurs in sedimentary rocks of the tertiary period. Oil exploration and production was systematically taken up after the Oil and Natural Gas Commission was set up in 1956. Till then, Digboi in Assam was the only oil producing region but the scenario changed after 1956. In recent years, new oil deposits have been found at the extreme western and eastern parts of the country. In Assam, Digboi, Naharkatiya and Moran are important oil producing areas. The major oilfields of Gujarat are Ankaleshwar, Kalol, Mehsana, Nawagam, Kosamba and Lunej. Mumbai High which lies 160 km off Mumbai was discovered in 1973 and production commenced in 1976. Oil and natural gas have been found in exploratory wells in Krishna-Godavari and Kaveri basin on the east coast.

Oil extracted from the wells is crude oil and contains many impurities. It cannot be used directly. It needs to be refined. There are two types of refineries in India: (a) field-based and (b) market-based. Digboi is an example of field-based and Barauni is an example of market-based refinery.

Natural Gas

Natural Gas is found with petroleum deposits and is released when crude oil is brought to

© NCERT not to be republished

Fig. 5.4 : India – Conventional Energy Resources

Activity: Collect information about cross country natural gas pipelines laid by GAIL (India) under 'One Nation One Grid'.

© NCERT not to be republished

the surface. It can be used as a domestic and industrial fuel. It is used as fuel in power sector to generate electricity, for heating purpose in industries, as raw material in chemical, petrochemical and fertiliser industries. With the expansion of gas infrastructure and local city gas distribution (COD) networks, natural gas is also emerging as a preferred transport fuel (CNG) and cooking fuel (PNG) at homes. India's major gas reserves are found in the Mumbai High and allied fields along the west coast which are supplemented by finds in the Cambay basin. Along the East Coast, new reserves of natural gas have been discovered in the Krishna-Godavari basin.

Non-Conventional Energy Sources

Fossil fuel sources, such as coal, petroleum, natural gas and nuclear energy use exhaustible raw materials. Sustainable energy resources are only the renewable energy sources like solar, wind, hydro-geothermal and biomass. These energy sources are more equitably distributed and environment-friendly. The non-conventional energy sources will provide more sustained, eco-friendly cheaper energy after the initial cost is taken care of.

Nuclear Energy Resources

Nuclear energy has emerged as a viable source in recent times. Important minerals used for the generation of nuclear energy are uranium and thorium. Uranium deposits occur in the Dharwar rocks. Geographically, uranium ores are known to occur in several locations along the Singbhum Copper belt. It is also found in Udaipur, Alwar and Jhunjhunu districts of Rajasthan, Durg district of Chhattisgarh, Bhandara district of Maharashtra and Kullu district of Himachal Pradesh. Thorium is mainly obtained from monazite and ilmenite in the beach sands along the coast of Kerala and Tamil Nadu. World's richest monazite deposits occur in Palakkad and Kollam districts of Kerala, near Vishakhapatnam in Andhra Pradesh and Mahanadi river delta in Odisha.

Atomic Energy Commission was established in 1948, progress could be made only after the establishment of the Atomic Energy Institute at Trombay in 1954 which was renamed as the Bhabha Atomic Research Centre in 1967. The important nuclear power projects are Tarapur (Maharashtra), Rawatbhata near Kota (Rajasthan), Kalpakkam (Tamil Nadu), Narora (Uttar Pradesh), Kaiga (Karnataka) and Kakarapara (Gujarat).

Solar Energy

Sun rays tapped in photovoltaic cells can be converted into energy, known as solar energy. The two effective processes considered to be very effective to tap solar energy are photovoltaics and solar thermal technology. Solar thermal technology has some relative advantages over all other non-renewable energy sources. It is cost competitive, environment friendly and easy to construct. Solar energy is 7 per cent more effective than coal or oil based plants and 10 per cent more effective than nuclear plants. It is generally used more in appliances like heaters, crop dryers, cookers, etc. The western part of India has greater potential for the development of solar energy in Gujarat and Rajasthan.

Wind Energy

Wind energy is absolutely pollution free, inexhaustible source of energy. The mechanism of energy conversion from blowing wind is simple. The kinetic energy of wind, through turbines is converted into electrical energy. The

© NCERT not to be republished

Fig. 5.5 : India – Oil Refineries

© NCERT not to be republished

India's next agriculture revolution can happen under solar panels

How Agrivoltaics presents us a rare opportunity to decarbonize the agriculture sector and achieve Just Transition.

In September 2023, India crossed 70,000 MW solar installed capacity making it one of the 5 countries in the world to reach this milestone. But we have a long way to go. It is now crystal clear that solar will be India's energy future for day time electricity, peak time with storage, for powering electric mobility and for producing green hydrogen. We could be looking at 1500 GW by 2050 and studies even project solar capacity at 5600 GW by 2070 to achieve our Net Zero target. The deployment strategy, therefore, is of critical importance.

The focus so far has been primarily on large utility scale solar in western India and parts of the southern peninsula with better solar radiation and ostensibly barren land. The advantages of large plants have been lower generation costs, easier implementation by large companies drawing large foreign investments. Land is, however, becoming increasingly a constraint and a developing problem is the country being divided into producers and consumers which will become a crucial factor in a just transition away from coal.

India's soaring solar growth proves renewables are the future

Nishant Saxena

In a world where climate change looms as an existential threat, the importance of renewable energy cannot be overstated. A recent study by energy think tank Ember sheds light on India's remarkable contribution to global solar energy generation. The report, which analyzes electricity data from the first half of 2023, reveals that India, alongside the European Union, contributed 12% to the global increase in solar generation during this period.

In a landscape where every percentage point matters in the fight against climate change, India's substantial contribution is cause for celebration. The study considered data from 78 countries representing 92% of global electricity demand, providing a comprehensive overview of the state of renewable energy on a global scale.

Globally, solar energy accounted for 5.5% of electricity generation in the first half of 2023, marking a significant 16% increase compared to the same period last year, equivalent to an additional 104 terawatt-hours. India's solar growth was even more impressive, with a 26% increase contributing an additional 12 terawatt-hours, outpacing the global average. This substantial growth powered half of the country's increased electricity demand over the same period, demonstrating the immense potential of solar energy in meeting India's energy needs

ONGC begins 'first oil production' from deep-water block in Krishna-Godavari basin

The block will help increase ONGC's total production of oil and natural gas by 11% and 15% respectively; peak production of the field is expected to be around 45,000 barrels of oil per day and over 10 MMSCMD of gas

ONGC commencing its first oil production from
Kakinada coast on January 7.

How India is utilising non-conventional energy resources? Discuss.

permanent wind systems such the trade winds, westerlies and seasonal wind like monsoon have been used as source of energy. Besides these, local winds, land and sea breezes can also be used to produce electricity.

India, already has started generating wind energy. In Rajasthan, Gujarat, Maharashtra and Karnataka, favourable conditions for wind energy exist.

Tidal and Wave Energy

Ocean currents are the store-house of infinite energy. Since the beginning of seventeenth and eighteenth century, persistent efforts were made to create a more efficient energy system from the ceaseless tidal waves and ocean current.

Large tidal waves are known to occur along the west coast of India. Hence, India has great potential for the development of tidal energy along the coasts but so far these have not yet been utilised.

Geothermal Energy

When the magma from the interior of earth, comes out on the surface, tremendous heat is released. This heat energy can successfully be tapped and converted to electrical energy. Apart from this, the hot water that gushes out through the geyser wells is also used in the generation of thermal energy. It is popularly known as Geothermal energy. This energy is now considered to be one of the key energy sources which can be developed as an alternate source. The hot springs and geysers are being used since medieval period. In India, a geothermal energy plant has been commissioned at Manikaran in Himachal Pradesh.

© NCERT not to be republished

The first successful (1890) attempt to tap the underground heat was made in the city of Boise, Idaho (U.S.A.), where a hot water pipe network was built to give heat to the surrounding buildings. This plant is still working.

Bio-energy

Bio-energy refers to energy derived from biological products which includes agricultural residues, municipal, industrial and other wastes. Bio-energy is a potential source of energy conversion. It can be converted into electrical energy, heat energy or gas for cooking. It will also process the waste and garbage and produce energy. This will improve economic life of rural areas in developing countries, reduce environmental pollution, enhance self-reliance and reduce pressure on fuel wood. One such project converting municipal waste into energy is Okhla in Delhi.

Conservation of Mineral Resources

The challenge of sustainable development requires integration of quest for economic development with environmental concerns. Traditional methods of resource use result into generating enormous quantity of waste as well as create other environmental problems. Hence, for sustainable development calls for the protection of resources for the future generations. There is an urgent need to conserve the resources. The alternative energy sources like solar power, wind, wave, geothermal energy are inexhaustible resource. These should be developed to replace the exhaustible resources. In case of metallic minerals, use of scrap metals will enable recycling of metals. Use of scrap is specially significant in metals like copper, lead and zinc in which India's reserves are meagre. Use of substitutes for scarce metals may also reduce their consumption. Export of strategic and scarce minerals must be reduced, so that the existing reserve may be used for a longer period.

© NCERT not to be republished

EXERCISES

1. Choose the right answers of the following from the given options.

(i) In which one of the following States are the major oil fields located?

(a) Assam (c) Rajasthan

(b) Bihar (d) Tamil Nadu

(ii) At which one of the following places was the first atomic power station started?

(a) Kalpakkam (c) Rana Pratap Sagar

(b) Narora (d) Tarapur

(iii) Which one of the following is non-renewable source of energy?

(a) Hydel (c) Thermal

(b) Solar (d) Wind power

2 . Answer the following questions in about 30 words.

(i) Give an account of the distribution of mica in India.

(ii) What is nuclear power? Mention the important nuclear power stations in India.

(iii) Name non-ferrous metal. Discuss their spatial distribution.

(iv) What are non-conventional sources of energy?

3. Answer the following questions in about 150 words.

(i) Write a detailed note on the Petroleum resources of India.

(ii) Write an essay on hydel power in India.

© NCERT not to be republished

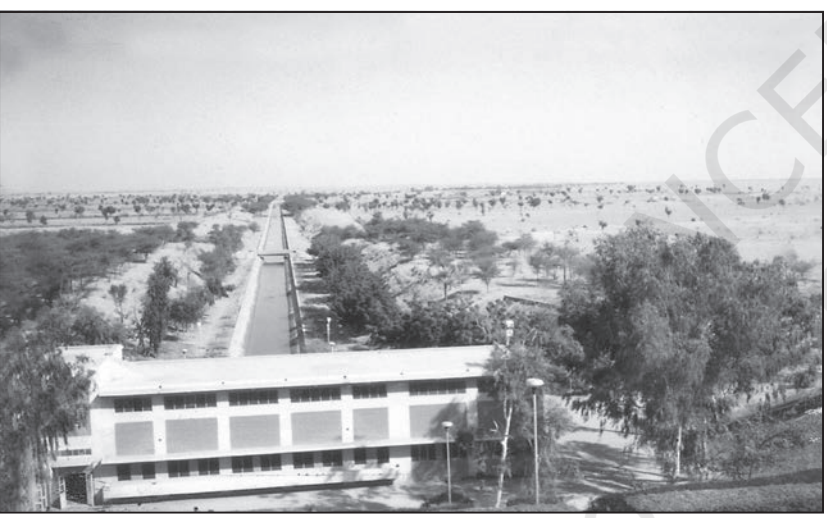
Reprint 2026-27

Unit III

Chapter 6

12099CH09

PLANNING AND SUSTAINABLE DEVELOPMENT IN INDIAN CONTEXT



The word 'planning' is not new to you as it is a part of everyday usage. You must have used it with reference to preparation for your examination or visit to a hill station. It involves the process of thinking, formulation of a scheme or programme and implementation of a set of actions to achieve some goal. Though it is a very broad term, in this chapter, it has been used with reference to the process of economic development. It is, thus different from the traditional hit-and-miss methods by which reforms and reconstruction are often undertaken. Generally, there are two approaches to planning, i.e., sectoral planning and regional planning. Sectoral planning means formulation and implementation of the sets of schemes or programmes aimed at development of various sectors of the economy, such as agriculture, irrigation, manufacturing, power, construction, transport, communication, social infrastructure and services.

There is no uniform economic development over space in any country. Some areas are more developed and some lag behind. This uneven pattern of development over space necessitates that the planners have a spatial perspective and draw the plans to reduce regional imbalance in development. This type of planning is termed as regional planning.

On 1 January 2015, the NITI Aayog was formed. India adopted centralised planning after Independence, but subsequently, it graduated into decentralised multi-level planning. The responsibility of plan formulation was with the Planning Comminssion at the Centre, State and district levels. But on 1 January 2015, the Planning Commision was replaced by the NITI Aayog.

NITI Aayog has been set up with the objective of involving the states in economic policy making for India for providing strategic and technical advice to the Central and State governments.

© NCERT not to be republished

Target Area Planning

The planning process has to take special care of those areas which have remained economically backward. As you know, the economic development of a region depends upon its resource base. But sometimes resource-rich region also remain backward. Economic development requires technology, as well as, investment besides resources. With the planning experience of about one-and-a-half decades, it was realised that regional imbalances in economic development were getting accentuated. In order to arrest the accentuation of regional and social disparties, the Planning Commission introduced the '*target area*' and *target group* approaches to planning. Some of the examples of programmes directed towards the development of target areas are *Command Area Development Programme, Drought Prone Area Development Programme, Desert Development Programme, Hill Area Development Programme. The Small Farmers Development Agency (SFDA) and Marginal Farmers Development Agency (MFDA)* which are the examples of target group programme.

In the 8th Five Year Plan special area programmes were designed to develop infrastructure in hill areas, north-eastern states, tribal areas and backward areas.

Hill Area Development Programme

Hill Area Development Programmes were initiated during the Fifth Five Year Plan covering 15 districts comprising all the hilly districts of Uttar Pradesh (present Uttarakhand), Mikir Hill and North Cachar hills of Assam, Darjeeling district of West Bengal and Nilgiri district of Tamil Nadu. The National Committee on the Development of Backward Area in 1981 recommended that all the hill areas in the country having height above 600 m and not covered under tribal sub-plan be treated as backward hill areas.

The detailed plans for the development of hill areas were drawn keeping in view their topographical, ecological, social and economic conditions. These programmes aimed at harnessing the indigenous resources of the hill areas through development of horticulture, plantation, agriculture, animal husbandry, poultry, forestry and small-scale and village industry.

Drought Prone Area Programme

This programme was initiated during the Fourth Five Year Plan with the objectives of providing employment to the people in drought-prone areas and creating productive assets. Initially, this programme laid emphasis on the construction of labour-intensive civil works. But later on, it emphasised on irrigation projects, land development programmes, afforestation, grassland development and creation of basic rural infrastructure, such as electricity, roads, market, credit and services.

The National Committee on Development of Backward Areas reviewed the performance of this programme. It has been observed that this programme is largely confined to the development of agriculture and allied sectors with major focus on restoration of ecological balance. Since growing population pressure is forcing the society to utilise the marginal lands for agriculture, and, thereby causing ecological degradation, there is a need to create alternative employment opportunities in the drought-prone areas. The other strategies of development of these areas include adoption of integrated watershed development approach at the micro-level. The restoration of ecological balance between water, soil, plants, and human and animal population should be a basic consideration in the strategy of development of drought-prone areas.

The Planning Commission of India (1967) identified 67 districts (entire or partly) of the country prone to drought. The *Irrigation Commission* (1972) introduced the criterion of 30 per cent irrigated area and demarcated the drought-prone areas. Broadly, the drought-prone area in India spread over semi-arid and arid tract of Rajasthan, Gujarat, Western Madhya Pradesh, Marathwada region of Maharashtra, Rayalseema and Telangana plateaus of Andhra Pradesh, Karnataka plateau and highlands and interior parts of Tamil Nadu. The drought-prone areas of Punjab, Haryana and north-Rajasthan are largely protected due to spread of irrigation in these regions.

© NCERT not to be republished

Case Study – Integrated Tribal Development Project in Bharmaur* Region

Bharmaur tribal area comprises Bharmaur and Holi tehsils of Chamba district of Himachal Pradesh. It is a notified tribal area since 21 November 1975. Bharmaur is inhabited by '*Gaddi*', a tribal community who have maintained a distinct identity in the Himalayan region as they practised transhumance and conversed through *Gaddiali* dialect.

Bharmaur tribal region has harsh climate conditions, low resource base and fragile environment. These factors have influenced the society and Economy of the region. According to the 2011 census, the total population of Bharmaur sub-division was 39,113 i.e., 21 persons per sq km. It is one of the most (economically and socially) backward areas of Himachal Pradesh. Historically, the *Gaddis* have experienced geographical and political isolation and socio-economic deprivation. The economy is largely based on agriculture and allied activities such as sheep and goat rearing.

The process of development of tribal area of Bharmaur started in 1970s when *Gaddis* were included among '*scheduled tribes*'. Under the Fifth Five Year Plan, the tribal sub-plan was introduced in 1974 and Bharmaur was designated as one of the five Integrated Tribal Development Projects (ITDP) in Himachal Pradesh. This area development plan was aimed at improving the quality of life of the *Gaddis*

This region lies between 32° 11' N and 32°41' N latitudes and 76° 22' E and 76° 53'E longitudes. Spread over an area of about 1,818 sq km, the region mostly lies between 1,500 m to 3,700 m above the mean sea level. This region popularly known as the homeland of *Gaddis* is surrounded by lofty mountains on all sides. It has *Pir Panjal* in the north and *Dhaula Dhar* in the south. In the east, the extension of *Dhaula Dhar* converges with Pir Panjal near *Rohtang Pass*. The river *Ravi* and its tributaries– the *Budhil* and the *Tundahen,* drain this territory, and carve out deep gorges. These rivers divide the region into four physiographic divisions called *Holi*, *Khani*, *Kugti* and *Tundah* areas. Bharmaur experiences freezing weather conditions and snowfall in winter. Its mean monthly temperature in January remains 4°C and in July 26°C.

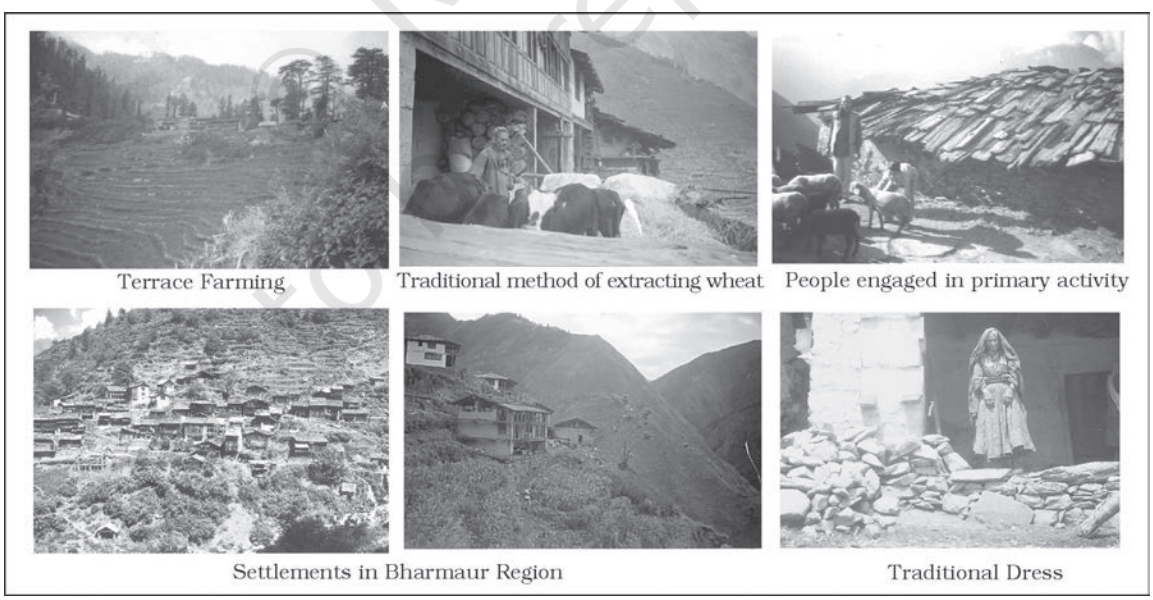


Fig. 6.1

* The name Bharmaur is derived from Sanskrit word Brahmaur. In this book Bharmaur has been used to retain the colloquial flavour.

Reprint 2026-27

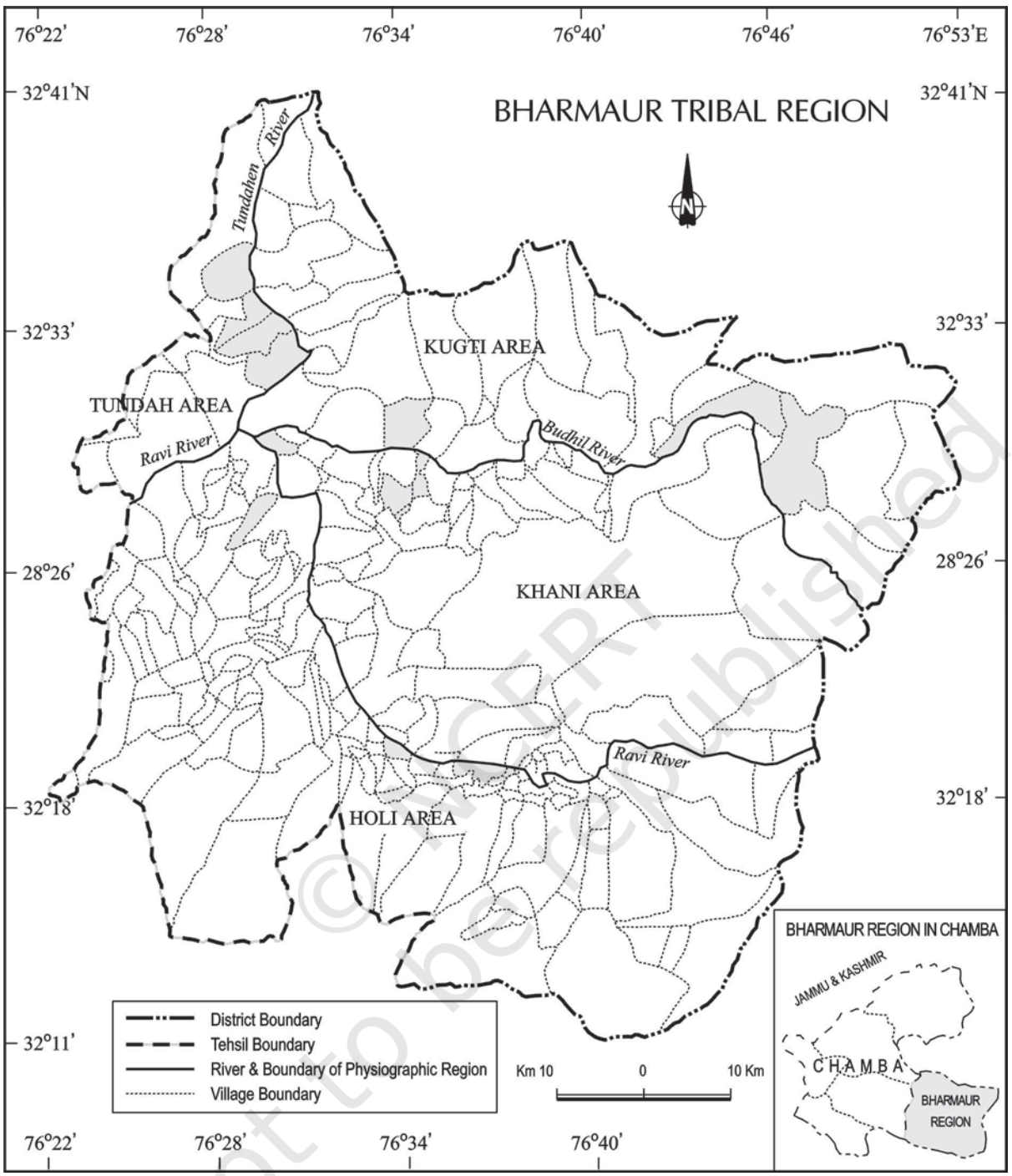


Fig. 6.2

and narrowing the gap in the level of development between Bharmaur and other areas of Himachal Pradesh. This plan laid the highest priority on development of transport and communications, agriculture and allied activities, and social and community services.

The most significant contribution of tribal sub-plan in Bharmaur region is the development of infrastructure in terms of schools, healthcare facilities, potable water, roads, communications and electricity. But the villages located along the river Ravi in Holi and Khani areas are the main

© NCERT not to be republished

beneficiaries of infrastructural development. The remote villages in Tundah and Kugti areas still do not have sufficient infrastructure.

The social benefits derived from ITDP include tremendous increase in literacy rate, improvement in sex ratio and decline in child marriage. The female literacy rate in the region increased from 1.88 per cent in 1971 to 65 per cent in 2011. The difference between males and females in literacy level i.e. gender inequality, has also declined. Traditionally, the *Gaddis* had subsistence agricultural-cum-pastoral economy having emphasis on foodgrains and livestock production. But during the last three decades of twentieth century, the cultivation of pulses and other cash crops has increased in Bharmaur region. But the crop cultivation is still done with traditional technology. The declining importance of pastoralism in the economy of the region can be gauged from the fact that at present only about one-tenth of the total households practise transhumance. But the *Gaddis* are still very mobile as a sizeable section of them migrate to Kangra and surrounding areas during winter to earn their livings from wage labour.

Sustainable Development

The term development is generally used to describe the state of particular societies and the process of changes experienced by them. During a fairly large period of human history, the state of the societies has largely been determined by the interaction processes between human societies and their bio-physical environment. The processes of human-environment interaction depend upon the level of technology and institutions nurtured by a society. While the technology and institutions have helped in increasing the pace of human-environment interaction, the momentum thus, generated in return has accelerated technological progress and transformation and creation of institutions. Hence, development is a multi-dimensional concept and signifies the positive, irreversible transformation of the economy, society and environment.

The concept of development is dynamic and has evolved during the second half of twentieth century. In the post World War II era, the concept of development was synonymous to economic growth which is measured in terms of temporal increase in gross national product (GNP) and per capita income/per capita consumption. But, even the countries having high economic growth, experienced speedy rise in poverty because of its unequal distribution. So, in 1970s, the phrases such as *redistribution with growth* and *growth and equity* were incorporated in the definition of development. While dealing with the questions related to redistribution and equity, it was realised that the concept of development cannot be restricted to the economic sphere alone. It also includes the issues such as improving the well-being and living standard of people, availing of the health, education and equality of opportunity and ensuring political and civil rights. By 1980s, development emerged as a concept encapsulating wide-spread improvement in social as well as material well-being of all in a society.

The notion of sustainable development emerged in the wake of general rise in the awareness of environmental issues in the late 1960s in Western World. It reflected the concern of people about undesirable effects of industrial development on the environment. The publication of '***The Population Bomb***' by *Ehrlich* in 1968 and '***The Limits to Growth***' by *Meadows* and others in 1972 further raised the level of fear among environmentalists in particular and people in general. This sets the scenario for the emergence of new models of development under a broad phrase '*sustainable development.*'

Concerned with the growing opinion of world community on the environmental issues, the United Nations established a *World Commission on Environment and Development* (WCED) headed by the Norwegian Prime Minister Gro Harlem Brundtland. The Commission gave its report (also known as *Brundtland Report*) entitled '*Our Common Future*' in 1987. The report defines sustainable development as a "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs.*"

Sustainable development takes care of ecological, social and economic aspects of development during the present times and pleads

© NCERT not to be republished

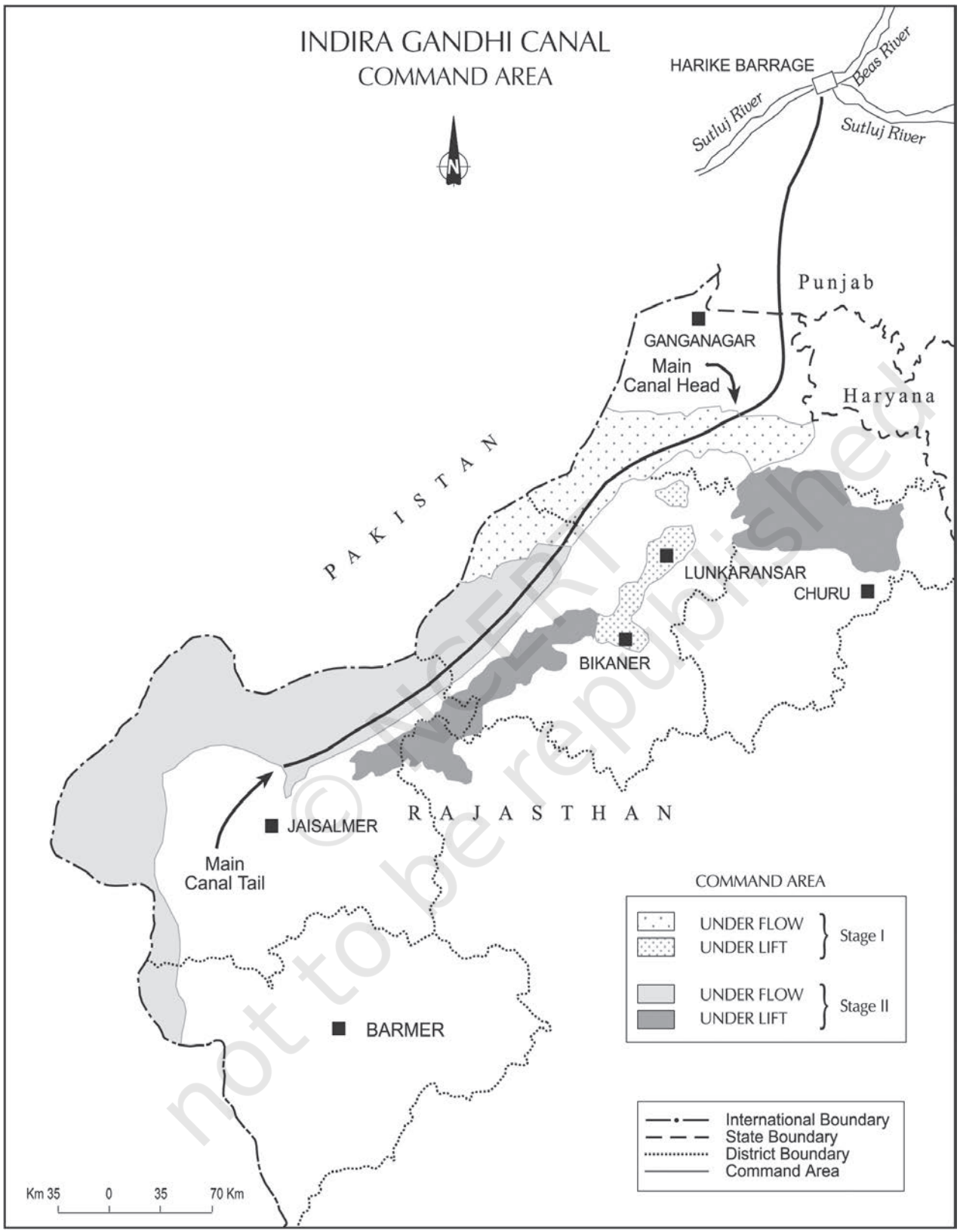


Fig. 6.3

© NCERT not to be republished

Fig. 6.4: Indira Gandhi Canal

Fig. 6.5 : Indira Gandhi Canal and its adjoining areas

for conservation of resources to enable the future generations to use these resources. It takes into account the development of whole human kind which have common future.

Case Study

Indira Gandhi Canal (Nahar) Command Area

Indira Gandhi Canal, previously known as the Rajasthan Canal, is one of the largest canal systems in India. Conceived by Kanwar Sain in 1948, the canal project was launched on 31 March, 1958. The canal originates at Harike barrage in Punjab and runs parallel to Pakistan border at an average distance of 40 km in Thar Desert (Marusthali) of Rajasthan. The total planned length of the system is 9,060 km catering to the irrigation needs of a total culturable command area of 19.63 lakh hectares. Out of the total command area, about 70 per cent was envisaged to be irrigated by flow system and the rest by lift system. The construction work of the canal system has been carried out through two stages. The command area of Stage-I lies in Ganganagar, Hanumangarh and northern part of Bikaner districts. It has a gently undulating topography and its culturable command area is 5.53 lakh hectares. The command area of Stage-II is spread over Bikaner, Jaisalmer, Barmer, Jodhpur, Nagaur and Churu districts covering culturable command area of 14.10 lakh ha. It comprises desert land dotted with shifting sand dunes and temperature soaring to 50°C in summers. In the lift canal, the water is lifted up to make it to flow against the slope of the land. All the lift canals of Indira Gandhi Canal system originate at the left bank of main canal while all the canals on the right bank of main canal are flow channels.

Irrigation in Stage-I command area of the canal was introduced in early 1960s, whereas, the command area of Stage-II began receiving irrigation in mid-1980s. The introduction of canal irrigation in this dry land has transformed its ecology, economy and society. It has influenced the environmental conditions of the region both positively as well as negatively. The availability of soil moisture for a longer period of time and various afforestation and pasture development programmes under CAD have resulted in greening the land. This has also helped in reducing wind erosion and siltation of canal systems. But the intensive irrigation and excessive use of water has led to the emergence of twin environmental problems of waterlogging and soil salinity.

Introduction of canal irrigation has brought about a perceptible transformation in the agricultural economy of the region. Soil moisture has been a limiting factor in successful growing of crops in this area. Spread of canal irrigation has led to increase in cultivated area and intensity of cropping. The traditional crops sown in the area, gram, bajra and jowar have been replaced by wheat, cotton, groundnut and rice. This is the result of intensive irrigation. This intensive irrigation, no doubt, initially has led to tremendous increase in agricultural and livestock productivity. This has also caused waterlogging

© NCERT not to be republished

and soil salinity, and thus, in the long run, it hampers the sustainability of agriculture.

Measures for Promotion of Sustainable Development

The ecological sustainability of Indira Gandhi Canal Project has been questioned by various scholars. Their point of view has also largely been validated by the course of development this region has taken during the last four decades, which has resulted in degradation of physical environment. It is a hard fact that attaining sustainable development in the command area requires major thrust upon the measures to achieve ecological sustainability. Hence, five of the seven measures proposed to promote sustainable development in the command area are meant to restore ecological balance.

(i) The first requirement is strict implementation of water management policy. The canal project envisages protective irrigation in Stage-I and extensive irrigation of crops and pasture development in Stage-II.

(ii) In general, the cropping pattern shall not include water intensive crops. It shall be adhered to and people shall be encouraged to grow plantation crops such as citrus fruits.

(iii) The CAD programmes such as lining of water courses, land development and levelling and *warabandi* system (equal distribution of canal water in the command area of outlet) shall be effectively implemented to reduce the conveyance loss of water.

(iv) The areas affected by water logging and soil salinity shall be reclaimed.

(v) The eco-development through afforestation, shelterbelt plantation and pasture development is necessary particularly in the fragile environment of Stage-II.

(vi) The social sustainability in the region can be achieved only if the land allottees having poor economic background are provided adequate financial and institutional support for cultivation of land.

(vii) The economic sustainability in the region cannot be attained only through development of agriculture and animal husbandry. The agricultural and allied activities have to develop alongwith other sectors of economy. This shall lead to diversification of economic base and establishment of functional linkages between basic villages, agro-service centres and market centres.

© NCERT not to be republished

Reprint 2026-27

EXERCISES

1. Choose the right answers of the following from the given options.

(i) Regional planning relates to :
- (a) Development of various sectors of economy.
- (b) Area specific approach of development.
- (c) Area differences in transportation network.
- (d) Development of rural areas.

(ii) ITDP refers to which one of the following?
- (a) Integrated Tourism Development Programme
- (b) Integrated Travel Development Programme
- (c) Integrated Tribal Development Programme
- (d) Integrated Transport Development Programme

(iii) Which one of the following is the most crucial factor for sustainable development in Indira Gandhi Canal Command Area?
- (a) Agricultural development
- (b) Eco-development
- (c) Transport development
- (d) Colonisation of land

2. Answer the following questions in about 30 words.

(i) What are the social benefits of ITDP in the Bharmaur tribal region?

(ii) Define the concept of sustainable development.

(iii) What are the positive impacts of irrigation on Indira Gandhi Canal Command Area?

3. Answer the following questions in about 150 words.

(i) Write short notes on drought-prone area programme. How does this programme help in the development of dryland agriculture in India?

(ii) Suggest the measures of promotion of sustainability in Indira Gandhi Canal Command Area.

Project

(i) Find out the area development programmes being implemented in your region. Assess the impact of such programmes on the society and economy in your locality.

(ii) Select your own area or identify an area facing severe environmental and socio-economic problems. Make an assessment of its resources and prepare their inventory. Suggest the measures for its sustainable development as it has been done in the case of Indira Gandhi Canal Command Area.

© NCERT not to be republished

Unit IV
Chapter 7

12099CH10

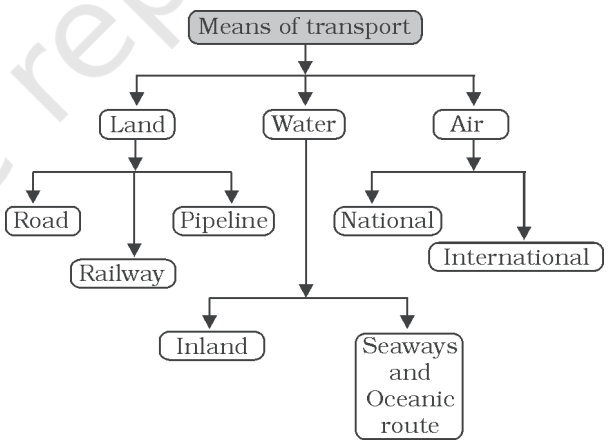
TRANSPORT AND COMMUNICATION

We use many items in our daily life. From toothpaste to our bed tea, milk, clothes, soaps, food items, etc., are required every day. All these can be purchased from the market. Have you ever thought as to how these items are brought from the site of production? All the production is meant for consumption. From the fields and factory, the produce is brought to the place from where consumers purchase it. It is the transportation of these items from the site of their production to the market which make them available to the consumer.

We not only use material things, like fruits, vegetables, books, clothes, etc., but also use ideas, views and messages in our daily life. Do you know we exchange our views, ideas and messages from one place to another or one individual to another while communicating with the help of various means?

The use of transport and communication depends upon our need to move things from place of their availability to the place of their use. Human beings use various methods to move goods, commodities, ideas from one place to another.

The following diagram shows the major means of transportation.



Land Transport

The pathways and unmetalled roads have been used for transportation in India since ancient times. With the economic and technological development, metalled roads and railways were developed to move large volume of goods and

© NCERT not to be republished

people from one place to another. Ropeways, cableways and pipelines were devised to cater to the demands of transporting specific goods under special circumstances.

Road Transport

India has one of the second largest road networks in the world with a total length of about 62.16 lakh km (morth.nic.in, Annual Report 2020-21).

Rain-soaked : Nomads go about their routine during an early morning downpour in Srinagar. Traffic on the 300-km Srinagar-Jammu and 434-km Srinagar-Leh National Highways is suspended as upper reaches of J&K saw heavy snowfall while rain lashed the plains.

A view of traffic flow in Delhi

Fig. 7.1

About 85 per cent of passenger and 70 per cent of freight traffic are carried by roads every year. Road transport is relatively suitable for shorter distance travel.

Do You Know ?

Sher Shah Suri built the *Shahi* (Royal) road to strengthen and consolidate his empire from the Indus Valley to the Sonar Valley in Bengal. This road was renamed the Grand Trunk (GT) road during the British period, connecting Calcutta and Peshawar. At present, it extends from Amritsar to Kolkata.

Collect information about National Highway number (old and new) from the website morth.nic.in/national-highway-details.

Road transport in modern sense was very limited in India before World War-II. The first serious attempt was made in 1943 when 'Nagpur Plan' was drawn. This plan could not be implemented due to lack of coordination among the princely states and British India. After Independence, twenty-year road plan (1961) was introduced to improve the conditions of roads in India. However, roads continue to concentrate in and around urban centres. Rural and remote areas had the least connectivity by road.

For the purpose of construction and maintenance, roads are classified as National Highways (NH), State Highways(SH), Major District Roads and Rural Roads.

National Highways

The main roads which are constructed and maintained by the Central Government are known as the National Highways. These roads are meant for inter-state transport and movement of defence men and material in strategic areas. These also connect the state capitals, major cities, important ports, railway junctions, etc. The length of the National Highways has increased from 19,700 km in 1951 to 1,36,440 km in 2020. The National Highways constitute only about 2 per cent of the total road length but carry 40 per cent of the road traffic.

The National Highways Authority of India (NHAI) was operationalised in 1995. It is an autonomous body under the Ministry of Surface Transport. It is entrusted with the responsibility of development, maintenance and operation of National Highways. This is also the apex body to improve the quality of the roads designated as National Highways.

© NCERT not to be republished

Table 7.1 : India Road Network 2020

Serial No.	Road Category	Length in Km
1.	National Highways	136440
2.	State Highways	176818
3.	Other Roads	5902539
	Total	**6215797**

Source: *Ministry of Road Transport and Highways Annual Report 2020-21. For latest data see website morth.nic.in*

National Highways Development Projects

NHAI has taken up some major projects in the country under different phases :

Golden Quadrilateral : It comprises construction of 5,846-km long 4/6 lane, high density traffic corridor, to connect India's four big metro cities of Delhi-Mumbai-Chennai-Kolkata. With the construction of Golden Quadrilateral, the time, distance and cost of movement among the mega cities of India will be considerably minimised.

North-South and East-West Corridors : North-South corridor aims at connecting Srinagar in Jammu and Kashmir with Kanniyakumari in Tamil Nadu (including Cochin-Salem Spur) with 4,076-km long road. The East-West Corridor has been planned to connect Silchar in Assam with the port town of Porbandar in Gujarat with 3,640-km of road length.

State Highways

These are constructed and maintained by state governments. They join the state capitals with district headquarters and other important towns. These roads are connected to the National Highways.

District Roads

These roads are the connecting link between District Headquarters and the other important nodes in the district.

Rural Roads

These roads are vital for providing links in the rural areas. About 80 per cent of the total road length in India are categorised as rural roads. There is regional variation in the density of rural road because these are influenced by the nature of the terrain.

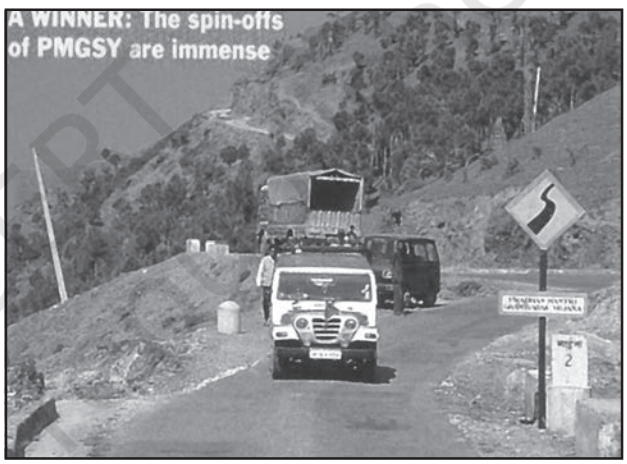


Fig. 7.2 : Road constructed under the Pradhan Mantri Gram Sadak Yojna

Why are the rural roads' density very low in hilly, plateau and forested areas? Why does the quality of rural roads deteriorate away from the urban centres?

Other Roads

Other roads include Border Roads and International Highways. The Border Road Organisation (BRO) was established in May 1960 for accelerating economic development and strengthening defence preparedness through rapid and coordinated improvement of strategically important roads along the

© NCERT not to be republished

northern and north-eastern boundary of the country. It is a premier multifaceted construction agency. It has constructed roads in high altitude mountainous terrain joining Chandigarh with Manali (Himachal Pradesh) and Leh (Ladakh). This road runs at an average altitude of 4,270 metres above the mean sea level.

Apart from the construction and maintenance of roads in strategically sensitive areas, the BRO also undertakes snow clearance in high altitude areas. The international highways are meant to promote the harmonious relationship with the neighbouring countries by providing effective links with India. (Fig. 7.4 and 7.5)

Fig. 7.3 : Khardung La Pass in Ladakh

DO YOU KNOW ?

The World's longest Highway tunnel — **Atal Tunnel** (9.02 Km) has been built by Border Road Organisation. This tunnel connects Manali to Lahaul-Spiti valley throughout the year. Earlier the valley was cut off for about 6 months each year owing to heavy snowfall. The Tunnel is built with ultra-modern specifications in the Pir Panjal range of Himalayas at an altitude of 3000 metres from the Mean Sea Level (MSL).

Source: http://www.bro.gov.in/pagefimg.asp?imid=144, And PIB Delhi 03 October 2020

Delhi-Lahore Bus

Fig. 7.4 : A Bus from Lahore to Delhi at Wagah Border

Fig. 7.5 : Aman Setu between Baramula and Muzaffarabad

© NCERT not to be republished

Activity

Why have Bengaluru and Hyderabad in the South and Delhi, Kanpur and Patna in north India have emerged as important nodes?

Bharatmala Pariyojana – 'Road' to country's infrastructure development

- The Bharatmala Pariyojna envisages development of about 26,000 km length of Economic Corridors, which along with Golden Quadrilateral (GQ) and North–South and East–West (NS-EW) Corridors are expected to carry majority of freight trafiic on roads.
- The Programme focuses on development of ring roads, bypasses and elevated corridores to decongest the traffic passing through cities and enhance logistic efficiency.

[Source: Press Information Bureau (Reseach Unit), Ministry of Information and Broadcasting, Government of India, December 13, 2021]

Rail Transport

Indian Railways, network is one of the longest in the world. It facilitates the movement of both freight and passengers and contributes to the growth of the economy. Mahatma Gandhi said, the Indian railways *"...brought people of diverse cultures together to contribute to India's freedom struggle".*

Indian Railway was introduced in 1853, when a line was constructed from Bombay to Thane covering a distance of 34 km.

Indian Railways is the largest government undertaking in the country. The length of Indian Railways network was 67,956 km (Railway yearbook 2019-20). Its very large size puts a lot of pressure on a centralised railway management system. Thus, in India, the railway system has been divided into 17 zones.

Table 7.2 : Indian Railways: Railway Zones and Headquarters

Railway Zone	Headquarters
Central	Mumbai CST
Eastern	Kolkata
East Central	Hajipur
East Coast	Bhubaneswar
Northern	New Delhi
North Central	Prayagraj
North Eastern	Gorakhpur
North East Frontier	Maligaon (Guwahati)
North Western	Jaipur
Southern	Chennai
South Central	Secunderabad
South Eastern	Kolkata
South East Central	Bilaspur
South Western	Hubli
Western	Mumbai (Church Gate)
West Central	Jabalpur
Metro Railway	Kolkata

Do You Know ?

On the basis of the width of track of the Indian Railways, three categories have been made:

Broad gauge: The distance between rails in broad gauge is 1.676 metre. The total length of broad gauge lines was 63950 km (2019-20).

Metre gauge: The distance between rails is one metre. Its total length was 2402 km (2019-20).

Narrow gauge: The distance between the rails in this case is 0.762 metre or 0.610 metre. The total length of narrow guage was 1604 km (2019-20). It is generally confined to hilly areas.

Indian Railways has launched extensive programme to convert the metre and narrow gauges to broad gauge. Moreover, steam

© NCERT not to be republished

engines have been replaced by diesel and electric engines. This step has increased the speed, as well as, the haulage capacity.

The replacement of steam engines run by coal has also improved the environment of the stations.

Metro rail has revolutionlised the urban transport system in India. Replacement of diesel buses by CNG-run vehicles along with the introduction of metro is a welcome step towards controlling the air pollution in urban centres.

Areas around towns, raw material producing areas and of plantations and other commercial crops, hill stations and cantonment towns were well-connected by railways from the British colonial era. These were mostly developed for the exploitation of resources. After the Independence of the country, railway routes have been extended to other areas too. The most significant development has been the development of Konkan Railway along the western coast providing a direct link between Mumbai and Mangaluru.

Railway continues to remain the main means of transport for the masses. Railway network is relatively less dense in the hill states, north eastern states, central parts of India and Rajasthan.

Which cities of India have Metro Rail Facility? Collect information about it and discuss in the classroom.

Konkan Railway

One of the important achievements of the Indian Railways has been the construction of Konkan Railway in 1998. It is 760-km long rail route connecting Roha in Maharashtra to Mangalore in Karnataka. It is considered an engineering marvel. It crosses 146 rivers, streams, nearly 2000 bridges and 91 tunnels. Asia's largest tunnel which is nearly 6.5 km long, also lies on this route. The states of Maharashtra, Goa and Karnataka are partners in this undertaking.

Water Transport

Waterways is an important mode of transport for both passenger and cargo traffic in India. It is the cheapest means of transport and is most suitable for carrying heavy and bulky material. It is a fuel-efficient and eco-friendly mode of transport. The water transport is of two types– (a) inland waterways, and (b) oceanic waterways.

Inland Waterways

It was the chief mode of transport before the advent of railways. It, however, faced tough competition from road and railway transport. Moreover, diversion of river water for irrigation purposes made them non-navigable in large parts of their courses. India has 14,500 km of navigable waterways, contributing about 1% to the country's transportation. It comprises rivers, canals, backwaters, creeks, etc.

Fig. 7.6 : River navigation in the North-east

© NCERT not to be republished

For the development, maintenance and regulation of national waterways in the country, the Inland Waterways Authority was set up in 1986. In order to create wide waterways network and to promote inland water transport in the country as an economical, environment friendly supplementary mode of transport to rail and road, 111 inland waterways (including 5 national waterways declared earlier, Table 7.3) were declared as National Waterways (NWs) by the National Waterways Act, 2016. *(Source: Annual Report, Ministry of Ports, Shipping & Waterways, Govt. of India, 2022-23)*

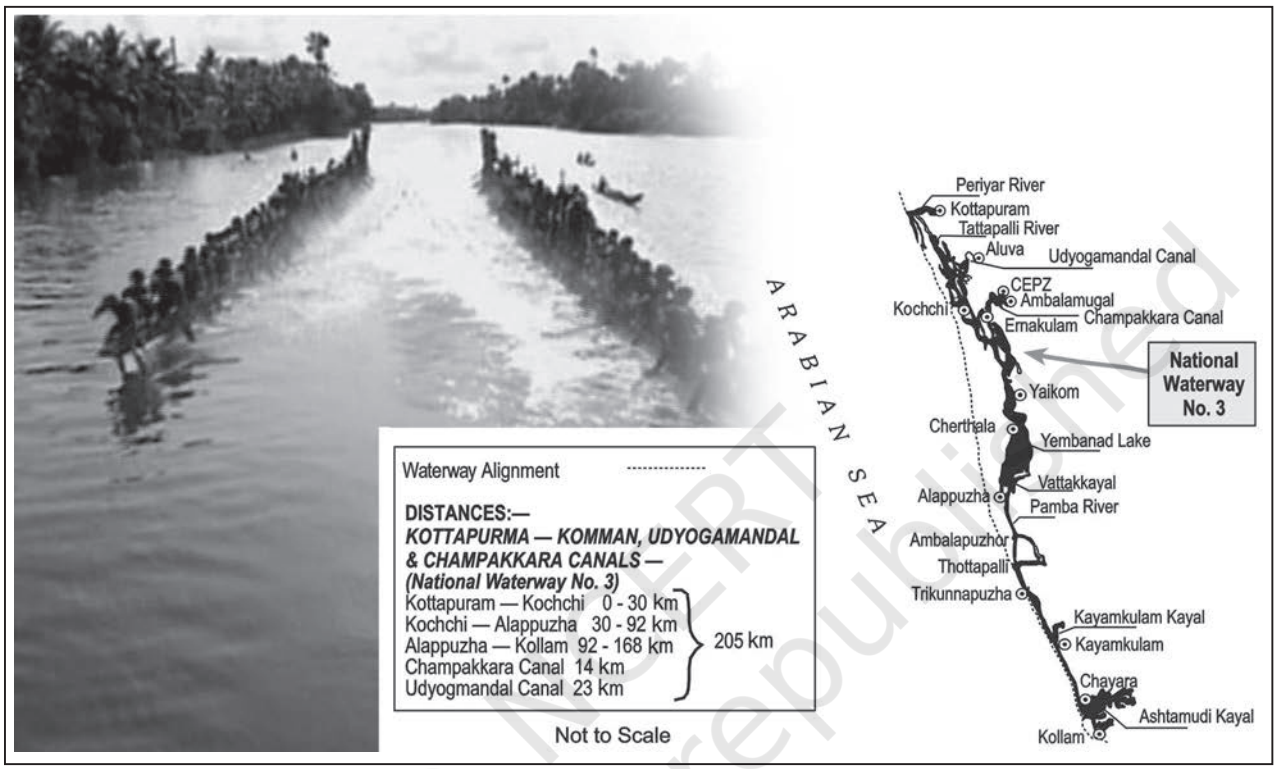


Fig. 7.7 : Natinal Waterway No.3

Table 7.3 National Waterways of India

Waterways	Stretch	Specification
NW 1	Prayagraj–Haldia stretch (1,620 km)	It is one of the most important waterways in India, which is navigable by mechanical boats up to Patna and by ordinary boats up to Haridwar. It is divided into three parts for developmental purposes – (i) Haldia–Farakka (560 km), (ii) Farakka–Patna (460 km), (iii) Patna–Prayagraj (600 km).
NW 2	Sadiya-Dhubri stretch (891 km)	Brahmaputra is navigable by steamers up to Dibrugarh (1,384 km) which is shared by India and Bangladesh
NW 3	Kottapuram-Kollam stretch (205 km)	It includes 168 km of west coast canal along with Champakara canal (14 km) and Udyogmandal canal (23 km).
NW 4	Specified streches of Godavari and Krishna rivers along with Kakinada Puducherry stretch of canals (1078 km)	
NW 5	Specified stretches of river Brahmani along with Matai river, delta channels of Mahanadi and Brahmani rivers and East Coast canals (588km).	

© NCERT not to be republished

The Inland Waterways Authority has also identified 10 other inland waterways, which could be upgraded. The backwaters (Kayal) of Kerala has special significance in Inland Waterway. Apart from providing cheap means of transport, they are also attracting a large number of tourists in Kerala. The famous Nehru Trophy Boat Race (VALLAMKALI) is also held in the backwaters.

Oceanic Routes

India has a vast coastline of approximate 7,517 km, including islands. Twelve major and 200 minor ports provide infrastructural support to these routes. Oceanic routes play an important role in the transport sector of India's economy. Approximately 95 per cent of India's foreign trade by volume and 70 per cent by value moves through ocean routes. Apart from international trade, these are also used for the purpose of transportation between the islands and the rest of the country.

Air Transportation

Air transport is the fastest means of movement from one place to the other. It has reduced distances by minimising the travel time. It is essential for a vast country like India, where distances are large and the terrain and climatic conditions are diverse.

Air transport in India made a beginning in 1911 when airmail operation commenced over a little distance of 10 km between Prayagraj and Naini. But its real development took place in post-Independent period. The Airport Authority of India is responsible for providing safe, efficient air traffic and aeronautical communication services in the Indian Air Space.

Do You Know ?

UDAN (*Ude Desh ka Aam Nagrik*) is a first-of-its kind scheme globally, designed to jump- start the regional aviation market. Regional Connectivity Scheme (RCS) -UDAN was conceived by the Ministry of Civil Aviation (MoCA) Govt. of India, to promote regional connectivity by making fly affordable for the common citizen. The central idea of the scheme is to encourage airlines to operate flights on regional and remote routes through enabling policies and extending incentives.

Pawan Hans is the helicopter service operating in hilly areas and is widely used by tourists in north-eastern sector.

In addition, Pawan Hans Limited mainly provides helicopter services to petroleum sector and for tourism.

Oil and Gas Pipelines

Pipelines are the most convenient and efficient mode of transporting liquids and gases over long distances. Even solids can also be transported by pipelines after converting them into slurry. Oil India Limited (OIL) under the administrative set up of the Ministry of Petroleum and Natural Gas is engaged in the exploration, production and transportation of crude oil and natural gas. It was incorporated in 1959 as a company. Asia's first cross country pipeline covering a distance of 1,157 km was constructed by OIL from Naharkatiya oilfield in Assam to Barauni refinery in Bihar. It was further extended up to Kanpur in 1966. GAIL (India) Ltd. was set up in 1984 as a public sector undertaking to transport, process and market natural gas for its economic use. The first 1,700 km long Hazira-Vijaipur-Jagdishpur (HVJ) cross country gas pipeline, constructed by GAIL (India), linked Mumbai

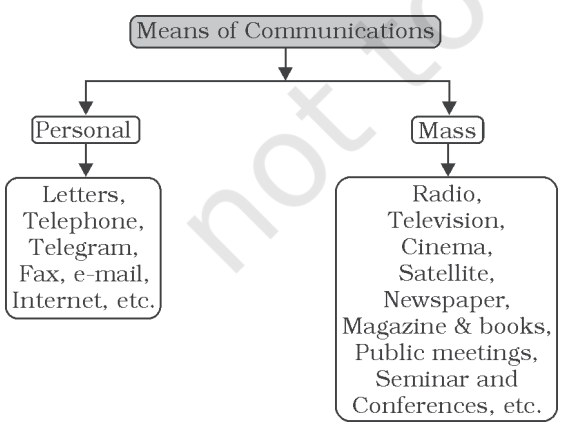
© NCERT not to be republished

High and Bassein gas fields with various fertiliser, power and industrial complexes in western and northern India. This artery provided impetus to Indian gas market development. Overall, India's gas infrastructure has expanded over ten times from 1,700 km to 18,500 km of cross-country pipelines and is expected to soon reach over 34,000 km as Gas Grid by linking all the gas sources and consuming markets across the country including North Eastern States.

Communication Networks

Human beings have evolved different methods of communication over time. In earlier times, the messages were delivered by beating the drum or hollow tree trunks, giving indications through smoke or fire or with the help of fast runners. Horses, camels, dogs, birds and other animals were also used to send messages. Initially, the means of communication were also the means of transportation. Invention of post-office, telegraph, printing press, telephone, satellite, etc has made the communication much faster and easier. Development in the field of science and technology has significantly contributed in bringing about revolution in the field of communication.

People use different modes of communication to convey the messages. On the basis of scale and quality, the mode of communication can be divided into following categories :



Personal Communication System

Among all the personal communication system internet is the most effective and advanced one. It is widely used in urban areas. It enables the user to establish direct contact through e-mail to get access to the world of knowledge and information. It is increasingly used for e-commerce and carrying out money transactions. The internet is like a huge central warehouse of data, with detailed information on various items. The network through internet and e-mail provides an efficient access to information at a comparatively low cost. It enables us with the basic facilities of direct communication.

Mass Communication System

Radio

Radio broadcasting started in India in 1923 by the Radio Club of Bombay. Since then, it gained immense popularity and changed the socio-cultural life of people. Within no time, it made a place in every household of the country. Government took this opportunity and brought this popular mode of communication under its control in 1930 under the Indian Broadcasting System. It was changed to All India Radio in 1936 and to Akashwani in 1957.

All India Radio broadcasts a variety of programmes related to information, education and entertainment. Special news bulletins are also broadcast at specific occasions like session of parliament and state legislatures.

Television (T.V.)

Television broadcasting has emerged as the most effective audio-visual medium for disseminating information and educating masses. Initially, the T.V. services were limited only to the National Capital where it began in 1959. After 1972, several other centres became operational. In 1976, TV was delinked from All India Radio (AIR) and got a separate identity

© NCERT not to be republished

as Doordarshan (DD). After INSAT-IA (National Television-DD1) became operational, Common National Programmes (CNP) were started for the entire network and its services were extended to the backward and remote rural areas.

Satellite Communication

Satellites are mode of communication in themselves as well as they regulate the use of other means of communication. However, use of satellite in getting a continuous and synoptic view of larger area has made satellite communication very vital for the country due to the economic and strategic reasons. Satellite images can be used for the weather forecast, monitoring of natural calamities, surveillance of border areas, etc.

On the basis of configuration and purposes, satellite system in India can be grouped into two: Indian National Satellite System (INSAT) and Indian Remote Sensing Satellite System (IRS). The INSAT, which was established in 1983,is a multi-purpose satellite system for telecommunication, meteorological observation and for various other data and programmes.

The IRS satellite system became operational with the launching of IRS-IA in March 1988 from Vaikanour in Russia. India has also developed her own Launching Vehicle PSLV (Polar Satellite Launch Vehicle). These satellites collect data in several spectral bands and transmit them to the ground stations for various uses. The National Remote Sensing Centre (NRSC) at Hyderabad provides facilities for acquisition of data and its processing. These are very useful in the management of natural resources.

EXERCISES

1. Choose the right answers of the following from the given options.

(i) In how many zones has the Indian Railways system been divided?

(a) 9 (c) 17

(b) 12 (d) 14

(ii) On which river and between which two places does the National Water Way No. 1 lie?

(a) The Brahmaputra, Sadiya-Dhubri

(b) The Ganga, Haldia–Prayagraj

(c) West Coast Canal, Kottapuram to Kollam

(d) Godavari–Kakinada Puducherry

(iii) In which of the following year, the first radio programme was broadcast?

(a) 1911 (c) 1927

(b) 1936 (d) 1923

© NCERT not to be republished

2. Answer the following questions in about 30 words.

(i) Which activity does transportation convey? Name three major modes of transportation.

(ii) Discuss advantages and disadvantages of pipeline transportation.

(iii) What do you mean by 'communication'?

3. Answer the following questions in about 150 words.

(i) Which are the chief means of transportation in India? Discuss the factors affecting their development.

(ii) Give a detailed account of the development of railways in India and highlight their importance.

(iii) Describe the role of roads in the economic development of India.

Project

Find out the facilities that Indian Railways provide to the passengers.

© NCERT not to be republished

Reprint 2026-27

Unit IV
Chapter 8

12099CH11

INTERNATIONAL TRADE

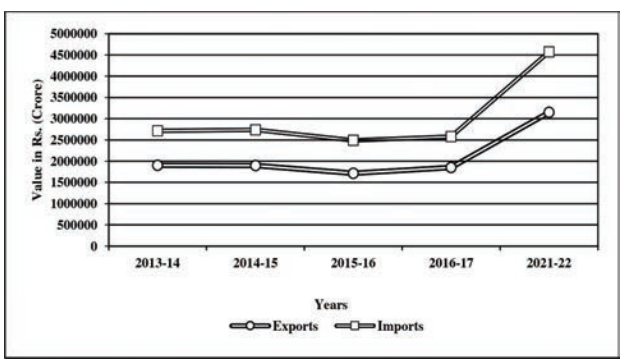
You have already studied about the various aspects of International trade in the book *Fundamentals of Human Geography*. International Trade is mutually beneficial as no country is self-sufficient. India's international trade has undergone a sea change in recent years in terms of volume, composition as well as direction. Although India's contribution in the world trade is as low as one per cent of the total volume, yet it plays a significant role in the world economy.

Let us examine the changing pattern of India's International trade. In 1950-51, India's external trade was worth Rs.1,214 crore, which rose to Rs. 77,19,796 crore in 2020-21. Can you calculate the percentage growth in 2020-21 over 1950-51? There are numerous reasons for this sharp rise in overseas trade, such as the momentum picked up by the manufacturing sectors, the liberal policies of the government and the diversification of markets.

The nature of India's foreign trade has changed over the years (Table 8.1). Though there has been an increase in the total volume of import and export, the value of import continued to be higher than that of exports.

Changing Pattern of the Composition of India's Exports

Extent of gap between Exports and Imports in India's foreign trade During 2013-14 to 2021-22



Source: Economic Survey 2022-23

Fig. 8.1

© NCERT not to be republished

Table 8.1 India's Foreign Trade

(Value in Rs. Crore)

Year	Exports	Imports	Trade Balance
2004-05	3,75,340	5,01,065	-1,25,725
2009-10	8,45,534	13,63,736	-5,18,202
2013-14	19,05,011	27,15,434	-8,10,423
2016-17	18,52,340	25,77,422	-7,25,082
2021-22	31,47,021	45,72775	-14,25,753

Source : http://commerce.nic.in/publications/annual-report - 2010-11 and Economic Survey 2016-17, 2022-23

Activity

Draw bar diagram to show the trends of exports of all items given in the table. Use pen/pencil of different colours.

Table 8.2 : Composition of India's Export, 2015-2022

(Percentage share in Exports)

Commodities	2015-16	2016-17	2020-21	2021-22
Agriculture and allied products	12.6	12.3	14.3	11.9
Ore and Minerals	1.6	1.9	3.2	2.0
Manufactured goods	72.9	73.6	71.2	67.8
Crude and petroleum products	11.9	11.7	9.2	16.4
Other commodities	1.1	0.5	2.1	1.9

Source : Economic Survey 2016-17 and 2022-23

The composition of commodities in India's international trade has been undergoing a change over the years. In export the share of agriculture and allied products and manufactured goods have decreased, whereas, share from crude petroleum and products and other commodities have increased. The share of ore and minerals have largely remained constant over the years from 2015-16 to 2021-22.

The decline in traditional items is largely due to the tough international competition. Amongst the agriculture products, there is a decline in the export of traditional item, such as cashew, etc., though an increase has been registered in floricultural products, fresh fruits, marine products and sugar, etc.

Manufacturing sector alone accounted for 67.8 per cent of India's total value of export in 2021-22. Engineering goods have shown a significant growth in the export. China and other East Asian countries are our major competitors. Gems and jewellery contributes a larger share of India's foreign trade.

Activity

Study Table 8.3 and select major commodities exported in 2021-22 and draw bar diagram.

Changing Patterns of the Composition of India's Import

India faced serious food shortage during 1950s and 1960s. The major item of import at that time was foodgrain, capital goods, machinery and equipment. The balance of payment was adverse as imports were more than export in spite of all the efforts of import substitution. After 1970s, foodgrain import was discontinued due to the success of Green

© NCERT not to be republished

Table 8.3 : Export of Some Principal Commodities

(in crore rupees)

Commodities	2021-22
Agriculture and allied products	3,75,742
Ores and Minerals	63,754
Manufactured goods	21,32,296
Mineral fuels and Lubricants	5,15,310

Source : Economic Survey 2022-23.

revolution but the energy crisis of 1973 pushed the prices of petroleum, and import budget was also pushed up. Foodgrain import was replaced by fertilisers and petroleum. Machine and equipment, special steel, edible oil and chemicals largely make the import basket. Examine the changing pattern of imports in Table 8.4 and try to comprehend the shifts.

Table 8.4 shows that there is a rise in the import of petroleum products. It is used not only as a fuel but also as an industrial raw material. It indicates the tempo of rising industrialisation and better standard of living, Sporadic price rise in the international market is another reason for the same. It is also noticed that the, import of capital goods maintained a steady decline. Import of food and allied products declined. Other major items of India's import include pearls, precious and semi-precious stones, gold and silver, non-metal ferrous metals. The detail of Indian imports of some principal commodities during 2021-22 have been given in Table 8.5.

Based on Table 8.5, few activities may be undertaken:

Arrange the items in ascending or descending order and write the names of the first five major items of India's import list of 2021-22.

Why does India import edible oil in spite of being an agriculturally rich country?

Select five most important and five least important items and represent them by bar diagram.

Can you identify some items of imports for which substitutes can be developed in India?

Table 8.4 : India Composition of Import 2015-22

(In percentage)

Commodity Group	2015-16	2016-17	2020-21	2021-22
Food and allied products	5.1	5.6	4.5	4.4
Fuel (Coal, POL)	25.4	26.7	25.1	31.6
Fertilisers	2.1	1.3	1.9	2.3
Paper board manufacturing and news print	0.8	0.9	0.8	0.7
Capital goods	13.0	13.6	12.7	10.1
Others	38.1	37.0	41.6	38.5

Source : Economic Survey 2022-23

© NCERT not to be republished

Table 8.5 : Import of Some Principal Commodities
(in crore rupees)

Commodities	2021-22
Fertilisers and fertiliser manufacturing	105796
Edible oils	141532
Pulp and waste paper	11934
Non-ferrous metals	499766
Iron and steel	94053
Petroleum, oil and lubricants	1207803
Pearls, precious and semi-precious stones	231279
Medicinal and Pharma products	67545
Chemical products	308882

Source : Economic Survey 2022-23

Direction of Trade

India has trade relations with most of the countries and major trading blocks of the world.

Region-wise and sub-region-wise trade during the period 2021-22 has been given in Table 8.6.

Table 8.6 Direction of India's Import trade
(in crore rupees)

Region	Imports	
	2016-17	2021-22
Europe	403972	640577
Africa	193327	368156
North America	195332	378041
Latin America	115762	161995
Asia and ASEAN	1544520	2918577

Source : Economic Survey 2016-17 and 2022-23

India aims to double its share in the international trade within the next five years. It has already started adopting suitable measures such as import liberalisation, reduction in import duties, delicensing and change from process to product patents.

Activity

Draw a multiple bar diagram to represent the major trading partners.

Most of India's foreign trade is carried through sea and air routes. However, a small portion is also carried through land route to neighbouring countries like Nepal, Bhutan, Bangladesh and Pakistan.

Sea Ports as Gateways of International Trade

India is surrounded by sea from three sides and is bestowed with a long coastline. Water provides a smooth surface for very cheap transport provided there is no turbulence. India has a long tradition of sea faring and developed many ports with place name suffixed with *pattan* meaning port. An interesting fact about ports in India is that its west coast has more ports than its east coast.

Fig. 8.3 : Unloading of goods on port

© NCERT not to be republished

Can you find out the reasons for the variations in the location of ports along the two coasts?

Though ports have been in use since ancient times, the emergence of ports as gateways of international trade became important after the coming of the European traders and colonisation of the country by the British. This led to the variation in the size and quality of ports. There are some ports which have very vast area of influence and some have limited area of influence. At present, India has 12 major ports and 200 minor or intermediate ports. In case of the major ports, the central government decides the policy and plays regulatory functions. The minor ports are there whose policy and functions are regulated by state governments. The major ports handle larger share of the total traffic.

The British used the ports as suction points of the resources from their hinterlands. The extension of railways towards the interior facilitated the linking of the local markets to regional markets, regional markets to national markets and national markets to the international markets. This trend continued till 1947. It was expected that the country's Independence will reverse the process, but the partition of the country snatched away two very important ports, i.e., Karachi port went to Pakistan and Chittagong port to the erstwhile east-Pakistan and now Bangladesh. To compensate the losses, many new ports, like the Kandla in the west and the Diamond Harbour near Kolkata on river Hugli in the east were developed.

Despite this major setback, Indian ports continued to grow after the Independence. Today, Indian ports are handling large volumes of domestic, as well as, overseas trade. Most of the ports are equipped with modern infrastructure. Previously, the development and modernisation was the responsibility of the government agencies, but considering the increase in function and need to bring these ports at par with the international ports, private entrepreneurs have been invited for the modernisation of ports in India.

The capacity of Indian ports increased from 20 million tonnes of cargo handling in 1951 to more than 837 million tonnes in 2016.

Some of the Indian ports along with their hinterlands are as follows :

Deendayal Port (Kandla port) situated at the head of Gulf of Kuchchh has been developed as a major port to cater to the needs of western and north western parts of the country and also to reduce the pressure at Mumbai port. The port is specially designed to receive large quantities of petroleum and petroleum products and fertiliser. The offshore terminal at Vadinar has been developed to reduce the pressure at the port.

Demarcation of the boundary of the hinterland would be difficult as it is not fixed over space. In most of the cases, hinterland of one port may overlap with that of the other.

Mumbai is a natural harbour and the biggest port of the country. The port is situated closer to the general routes from the countries of Middle East, Mediterranean countries, North Africa, North America and Europe where the major share of country's overseas trade is carried out. The port is 20 km long and 6-10 km wide with 54 berths and has the country's largest oil terminal. M.P., Maharashtra, Gujarat, U.P. and parts of Rajasthan constitute the main hinterlands of Mumbai ports.

Jawaharlal Nehru Port at Nhava Sheva was developed as a satellite port to relieve the pressure at the Mumbai port. It is the largest container port in India.

Mormugao Port, situated at the entrance of the Zuari estuary, is a natural harbour in Goa. It gained significance after its remodelling in 1961 to handle iron-ore exports to Japan. Construction of Konkan railway has considerably extended the hinterland of this port. Karnataka, Goa, Southern Maharashtra constitute its hinterland.

New Mangalore Port is located in the state of Karnataka and caters to the needs of the export of iron-ore and iron-concentrates. It also handles fertilisers, petroleum products, edible

© NCERT not to be republished

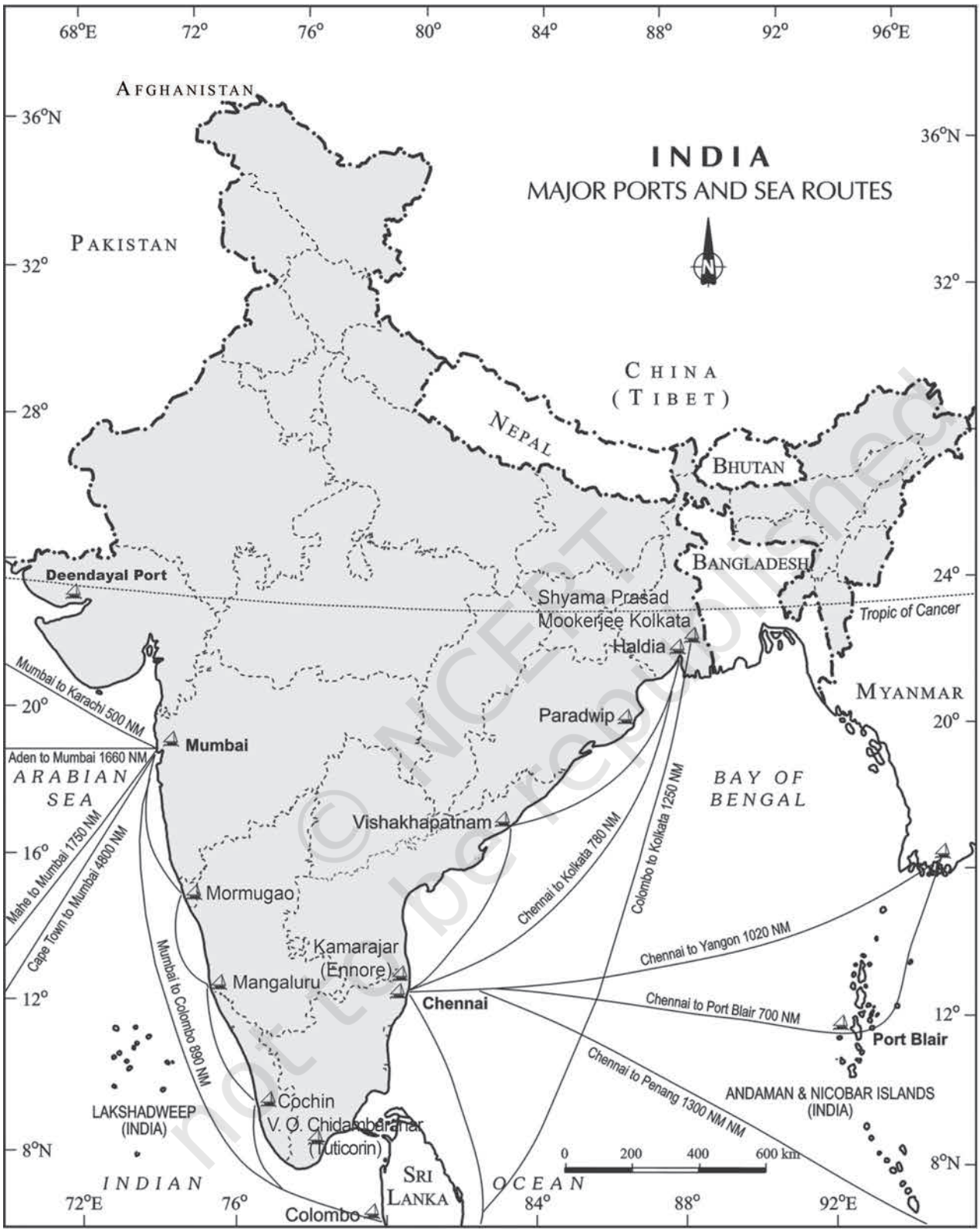


Fig. 8.4 : India – Major Ports and Sea Routes

© NCERT not to be republished

oils, coffee, tea, wood pulp, yarn, granite stone, molasses, etc. Karnataka is the major hinterland for this port.

Cochin Port, situated at the head of Vembanad Kayal, popularly known as the *'Queen of the Arabian Sea',* is also a natural harbour. This port has an advantageous location being close to the Suez-Colombo route. It caters to the needs of Kerala, southern-Karnataka and south western Tamil Nadu.

Shyama Prasad Mookerjee, Kolkata Port is located on the Hugli river, 128 km inland from the Bay of Bengal. Like the Mumbai port, this port was also developed by the British. Kolkata had the initial advantage of being the capital of British India. The port has lost its significance considerably on account of the diversion of exports to the other ports such as Vishakhapatnam, Paradwip and its satellite port, Haldia.

This port is also confronted with the problem of silt accumulation in the Hugli river which provides a link to the sea. Its hinterland covers U.P., Bihar, Jharkhand, West Bengal, Sikkim and the north-eastern states. Apart from this, it also extends ports facilities to our neighbouring land-locked countries such as Nepal and Bhutan.

Haldia Port is located 105 km downstream from Kolkata. It has been constructed to reduce the congestion at Kolkata port. It handles bulk cargo like iron ore, coal, petroleum, petroleum products and fertilisers, jute, jute products, cotton and cotton yarn, etc.

Paradwip Port is situated in the Mahanadi delta, about 100 km from Cuttack. It has the deepest harbour specially suited to handle very large vessels. It has been developed mainly to handle large-scale export of iron-ore. Odisha, Chhattisgarh and Jharkhand are the parts of its hinterland.

Visakhapatnam Port in Andhra Pradesh is a land-locked harbour, connected to the sea by a channel cut through solid rock and sand. An outer harbour has been developed for handling iron-ore, petroleum and general cargo. Andhra Pradesh and Telangana are the main hinterland for this port.

Chennai Port is one of the oldest ports on the eastern coast. It is an artificial harbour built in 1859. It is not much suitable for large ships because of the shallow waters near the coast. Tamil Nadu and Puducherry are its hinterland.

Kamarajar (Ennore), a newly developed port in Tamil Nadu, has been constructed 25 km north of Chennai to relieve the pressure at Chennai port.

V.O. Chidambaranar (Tuticorin) Port was also developed to relieve the pressure of Chennai port. It deals with a variety of cargo, including coal, salt, food grains, edible oils, sugar, chemicals and petroleum products.

Airports

Air transport plays an important role in the international trade. It has the advantage of taking the least time for carriage and handling high value or perishable goods over long distances. It is very costly and unsuitable for carrying heavy and bulky commodities. This ultimately reduces the participation of this sector in the international trade as compared to the oceanic routes.

There were 25 major airports functioning in the country (Annual Report 2016-17). They are Ahmedabad, Bengaluru, Chennai, Delhi, Goa, Guwahati, Hyderabad, Kolkata, Mumbai, Thiruvananthapuram, Srinagar, Jaipur, Calicut, Nagpur, Coimbatore, Cochin, Lucknow, Pune, Chandigarh, Mangaluru, Vishakhapatnam, Indore, Patna, Bhubaneswar and Kannur. Since 2017, under the UDAN scheme, a total number of 73 unserved/underserved airports including 9 Heliports and 2 water aerodromes have been operationalized (*Source: PIB, Ministry of Civil Aviation, Govt. of India, 2023*)

You have already studied about the air transport in the previous chapter. You consult the chapter on transport to find out the main features of air transport in India.

Activity

Name the nearest domestic and international airports from your place. Identify the state with maximum number of domestic airports.

Identify four cities where maximum number of air routes converge and also give reasons for this.

© NCERT not to be republished

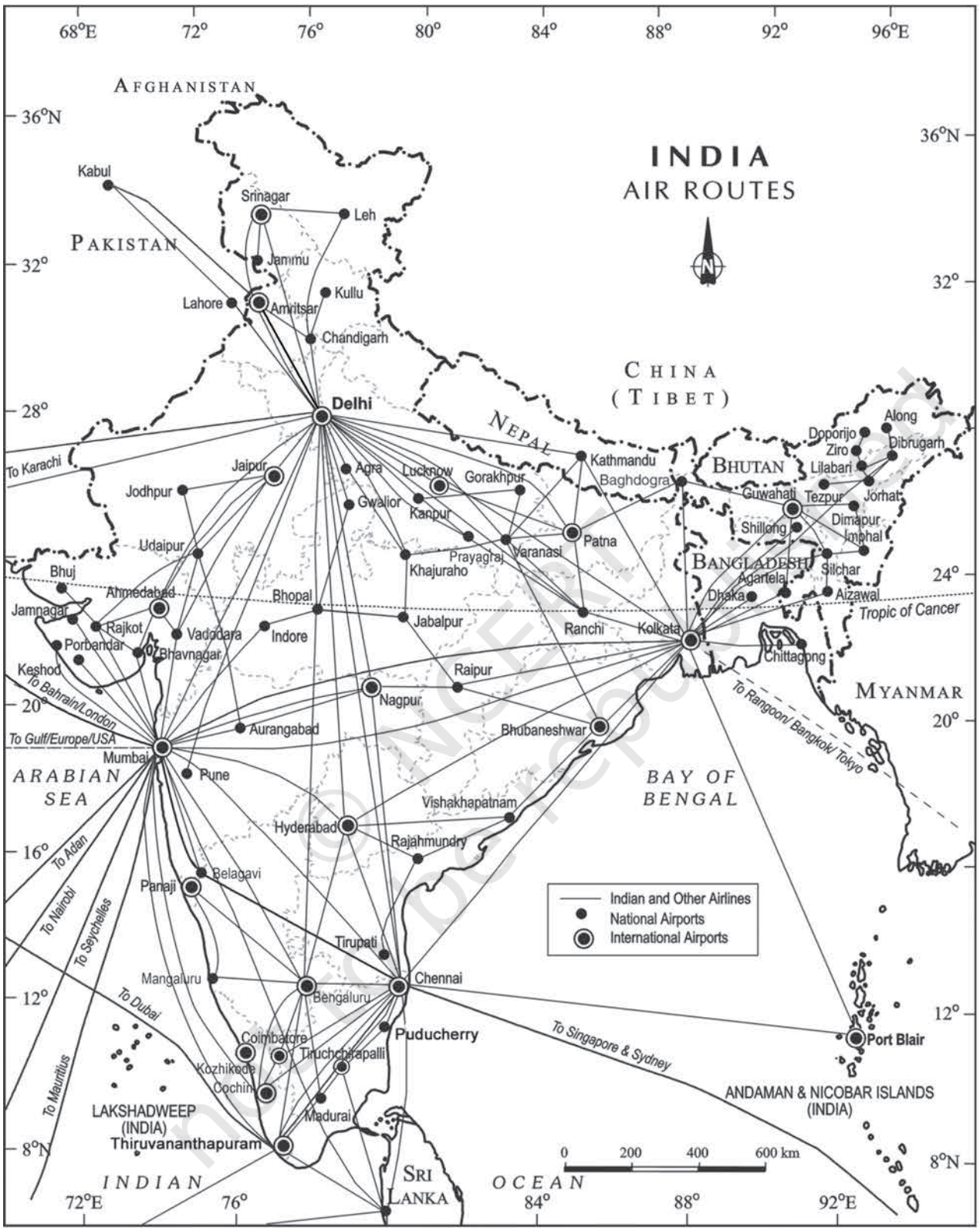


Fig. 8.5 : India – Air Routes

Reprint 2026-27

EXERCISES

1. Choose the right answers of the following from the given options.

(i) Trade between two countries is termed as

(a) Internal trade (c) International trade

(b) External trade (d) Local trade

(ii) Which one of the following is a land locked harbour?

(a) Vishakhapatnam (c) Kamarajar (Ennore)

(b) Mumbai (d) Haldia

(iii) Most of India's foreign trade is carried through

(a) Land and sea (c) Sea and air

(b) Land and air (d) Sea

2. Answer the following questions in about 30 words.

(i) Mention the characteristics of India's foreign trade.

(ii) Distinguish between port and harbour.

(iii) Explain the meaning of hinterland.

(iv) Name important items which India imports from different countries.

(v) Name the ports of India located on the east coast.

3. Answer the following questions in about 150 words.

(i) Describe the composition of export and import trade of India.

(ii) Write a note on the changing nature of the international trade of India.

© NCERT not to be republished

Unit V
Chapter 9

12099CH12

GEOGRAPHICAL PERSPECTIVE ON SELECTED ISSUES AND PROBLEMS

Environmental Pollution

Environmental pollution results from 'the release of substances and energy from waste products of human activities. There are many types of pollution. They are classified on the basis of medium through which pollutants are transported and diffused. Pollution can be classified into (i) air pollution, (ii) water pollution, (iii) land pollution and (iv) noise pollution.

Water Pollution

Indiscriminate use of water by increasing population and industrial expansion has led degradation of the quality of water considerably. Surface water available from rivers, canals, lakes, etc. is never pure. It contains small quantities of suspended particles, organic and inorganic substances. When concentration of these substances increases, the water becomes polluted, and hence becomes unfit for use. In such a situation, the self-purifying capacity of water is unable to purify the water.

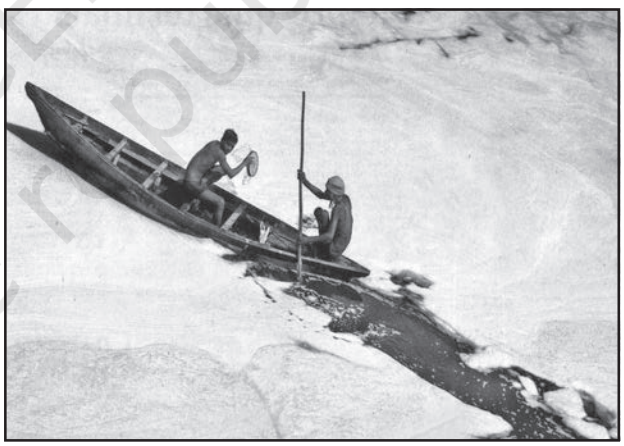


Fig.9.1 : Cutting Through Effluent : Rowing through a pervasive layer of foam on the heavily polluted Yamuna on the outskirts of New Delhi

Though water pollutants are also created from natural sources (erosion, landslides, decay and decomposition of plants and animals, etc.) pollutants from human activities are the real causes of concern. Human beings pollute the water through industrial, agricultural and cultural activities. Among these activities, industry is the most significant contributor.

© NCERT not to be republished

Table 9.1 : Types and Sources of Pollution

Pollution Types	Pollution Involved	Sources of Pollution
Air Pollution	Oxides of sulphur (SO_2, SO_3), Oxides of nitrogen, carbon monoxide, hydro-carbon, ammonia, lead, aldehydes asbestos and beryllium.	Combustion of coal, petrol and diesel, industrial processes, solid waste disposal, sewage disposal, etc.
Water Pollution	Odour, dissolved and suspended solids, ammonia and urea, nitrate and nitrites, chloride, fluoride, carbonates, oil and grease, insecticide and pesticide residue, tannin, coliform MPM (bacterial count) sulphates and sulphides, heavy metals e.g. lead, aresenic, mercury, manganese, etc., radioactive substances.	Sewage disposal, urban run-off, toxic effluents from industries, run-off over cultivated lands and nuclear power plants.
Land Pollution	Human and animal excreta viruses and bacteria, garbage and vectors therein, pesticides and fertiliser-residue alkalinity, fluorides, radio-active substances.	Improper human activities, disposal of untreated industrial waste, use of pesticides and fertilisers.
Noise Pollution	High level of noise above tolerance level.	Aircrafts, automobiles, trains, industrial processing and advertising media.

Industries produce several undesirable products including industrial wastes, polluted waste water, poisonous gases, chemical residuals, numerous heavy metals, dust, smoke, etc. Most of the industrial wastes are disposed off in running water or lakes. Consequently, poisonous elements reach the reservoirs, rivers and other water bodies, which destroy the bio-system of these waters. Major water polluting industries are leather, pulp and paper, textiles and chemicals.

Various types of chemicals used in modern agriculture such as inorganic fertilisers, pesticides and herbicides are also pollution generating components. These chemicals are washed down to rivers, lakes and tanks. These chemicals also infiltrate the soil to reach the ground water. Fertiliser induces an increase in the nitrate content of surface waters. Cultural activities such as pilgrimage, religious fairs, tourism, etc. also cause water pollution. In India, almost all

Table 9.2 : Sources of Pollution in the Ganga and the Yamuna Rivers

River and State	Polluted Stretches	Nature of Pollution	Main Polluters
Ganga (Uttar Pradesh) Bihar and West Bengal	(a) Downstream of Kanpur (b) Downstream of Varanasi (c) Farrakka Barrage	1. Industrial pollution from towns like Kanpur 2. Domestic wastes from urban centres 3. Dumping of carcasses in the river	Cities of Kanpur, Prayagraj, Varanasi, Patna and Kolkata release domestic waste into the river
Yamuna (Delhi) and (Uttar Pradesh)	(a) Delhi to confluence with Chambal (b) Mathura and Agra	1. Extraction of water by Haryana and Uttar Pradesh for irrigation 2. Agricultural run off resulting in high levels of micro-pollutants in the Yamuna 3. Domestic and industrial waste of Delhi flowing into the river	Delhi dumping its domestic waste

© NCERT not to be republished

surface water sources are contaminated and unfit for human consumption.

Water pollution is a source of various water- borne diseases. The diseases commonly caused due to contaminated water are diarrhoea, intestinal worms, hepatitis, etc. The World Health Organization shows that about one-fourth of the communicable diseases in India are water-borne. Though river pollution is common to all rivers, yet pollution of river Ganga flowing through one of the most populous regions of India has caused great concerns among all. To imporve the condition of the river, National Mission for Clean Ganga was initiated. The Namami Gange Programme has been launched for the same.

Namami Gange Programme

Ganga, as a river, has national importance but the river requires cleaning by effectively controlling the pollution for its water. The Union Government has launched the '*Namami Gange Programme*' with the following objectives:

- developing sewerage treatment systems in towns,
- monitoring of industrial effluents,
- development of river front,
- afforestation along the bank to increase biodiversity,
- cleaning of the river surface,
- development of 'Ganga Grams' in Uttarakhand, UP, Bihar, Jharkhand and West Bengal, and
- creating public awareness to avoid adding pollutants into the river even in the form of rituals.

Air Pollution

Air pollution is taken as addition of contaminants, like dust, fumes, gas, fog, odour, smoke or vapour to the air in substantial proportion and duration that may be harmful to flora and fauna and to property. With increasing use of varieties of fuels as the source of energy, there is a marked increase in emission of toxic gases into the atmosphere resulting in the pollution of air. Combustion of fossil fuels, mining and industries are the main sources of air pollution. These processes release oxides of sulphur and nitrogen, hydrocarbons, carbon dioxide, carbon monoxide, lead and asbestos.

Air pollution causes various diseases related to respiratory, nervous and circulatory systems.

Smog in Mumbai

Air pollution is world's top environmental health risk, WHO says

Sushmi Dey / TNN / Updated: Jun 2, 2015, 03:19 IST

Air pollution is the world's biggest environmental health risk, causing at least one in eight deaths around the globe, the World Health Organization has said.

Air pollution biggest killer in Southeast Asia, says WHO

A smoky haze that shrouded parts of Southeast Asia this month, forcing schools and businesses to close, is just one element of an air pollution problem that kills hundreds of thousands of people in the region annually, the World Health Organisation said.

Air pollution in major Southeast Asian and Chinese cities ranks among the worst in the world and contributes to the deaths of about 500,000 people each year, said Michal Krzyzanowski, an air quality specialist at the WHO's European Center for Environment and Health in Bonn.

Drifting smoke from purposely set forest fires in Indonesia caused Malaysia to declare a state of emergency last week in two areas outside Kuala Lumpur. Parts of Thailand were also blanketed in the haze.

Malaysia said hospitals reported a 150% increase in breathing problems and seven people who had a history of respiratory problems reportedly died. The government could not confirm the smoky air was to blame.

Worldwide, air pollution contributes to some 800,000 deaths each year. The emergency in Malaysia was lifted after two days. But meteorologists are predicting a new cloud will hover over parts of Malaysia and possibly Singapore.

The haze, blamed on illegal dry-season burning to clear land on Sumatra island, is an annual problem

© NCERT not to be republished

Smoky fog over cities called as urban *smog* is caused by atmospheric pollution. It proves very harmful to human health. Air pollution can also cause acid rains. Rainwater analysis of urban environment has indicated that pH value of the first rain after summer is always lower than the subsequent rains.

Noise Pollution

Noise pollution refers to the state of unbearable and uncomfortable to human beings which is caused by noise from different sources. This matter has become a serious concern only in recent years due to a variety of technological innovations.

The main sources of noise pollution are various factories, mechanised construction and demolition works, automobiles and aircraft, etc. There may be added periodical but polluting noise from sirens, loudspeakers used in various festivals, programmes

Fig. 9.2 : Noise monitoring at Panchpatmalai Bauxite Mine

associated with community activities. The level of steady noise is measured by sound level expressed in terms of decibels (dB).

Of all these sources, the biggest nuisance is the noise produced by traffic, because its intensity and nature depend upon factors, such as the type of aircraft, vehicle, train and the condition of road, as well as, that of vehicle (in case of automobiles). In sea traffic, the noise pollution is confined to the harbour due to loading and unloading activities being carried. Industries cause noise pollution but with varying intensity depending upon the type of industry.

Noise pollution is location specific and its intensity declines with increase in distance from the source of pollution, i.e. industrial areas, arteries of transportation, airport, etc. Noise pollution is hazardous in many metropolitan and big cities in India.

Do You Know ?

Oceans 10 times noisier today than 40 years ago

A study by Scripps Institute of Oceanography has revealed that Ocean Noise has increased tenfold since the 1960s. Oceanologists Sean Wiggins, John Hildebrand from Scripps and Mark McDonald from WhaleAcoustics, Colorado, studied declassified US Navy documents and came to the conclusion that global shipping has contributed a lot to increased undersea noise pollution. They said with populations increasing around the globe in recent decades, the underwater world had also become a noisier place, adding that the effects of greater noise on marine life was still unknown. Findings revealed a tenfold increase in underwater ocean noise as compared with the 1960s. They said the noise levels in 2003-2004 were about 10 to 12 decibels higher than in 1964-1966. The reasons could be due to the vast increase in the global shipping trade, the number of ships plying the oceans and higher speed of vessels.

Urban Waste Disposal

Urban areas are generally marked by overcrowding, congestion, inadequate facilities to support the fast growing population and consequent poor sanitary conditions and foul air. Environmental pollution by solid wastes has now got significance because of enormous growth in the quantity of wastes generated from various sources. Solid waste refers to a variety of old and used articles, for example stained small pieces of metals, broken glassware, plastic containers, polythene bags, ash, floppies, CDs, etc., dumped at different places. These discarded materials are also termed as refuse, garbage and rubbish, etc., and are disposed of from two sources : (i) household or domestic establishments, and (ii) industrial or commercial establishments. The household wastes are disposed off either on public lands or on private contractors' sites,

© NCERT not to be republished

whereas the solid wastes of industrial units are collected and disposed off through public (municipal) facilities at low lying public grounds (landfill areas). The huge turn out of ashes and debris from industries, thermal power houses and building constructions or demolitions have posed problems of serious consequences. Solid wastes cause health hazard through creation of obnoxious smell, and harbouring of flies and rodents, which act as carriers of diseases like typhoid, diphtheria, diarrhoea, malaria and cholera, etc. These wastes cause frequent nuisance as and when these are carelessly handled, spread by wind and splittered through rain water.

Concentration of industrial units in and around urban centres gives rise to disposal of industrial wastes. The dumping of industrial waste into rivers leads to water pollution. River pollution from city-based industries and untreated sewage leads to serious health problems downstream.

Urban waste disposal is a serious problem in India. In metropolitan cities like Mumbai, Kolkata, Chennai, Bengaluru, etc., about 90 per cent of the solid waste is collected and disposed. But in most of other cities and towns in the country, about 30 to 50 per cent of the waste generated are left uncollected which accumulate on streets, in open spaces between houses and in wastelands leading to serious

I moved into this second floor from the first to get a view of the sea and the garbage has piled up to this level obstructing the view.

Case Study : A Role Model to Restore the Ecology and Safeguard Human Health in Daurala

Based on the universal law "Polluter pays", effort to restore the ecology and safeguard the human health with people's participation has taken place in Daurala near Meerut. These efforts are now bearing fruits after a span of three years when Meerut based NGO had developed a model for ecological restoration. The meeting of the Daurala Industries officials, NGOs, Government officials and other stakeholders at Meerut has brought out results. The powerful logics, authentic studies and the pressure of people have brought a new lease of life to the twelve thousand residents of this village. It was in the year 2003 that the pitiable condition of Dauralaites drew the attention of the civil society. The groundwater of this village was contaminated with heavy metals. The reason was that the untreated wastewater of Daurala industries was leaching to the groundwater table. The NGO conducted a door to door survey of the health status of the residents and came out with a report. The organisation, the village community and people's representatives sat together to find out sustainable solutions to the health problem. The industrialists showed a keen interest towards checking the deteriorating ecology. The overhead water tank's capacity in the village was enhanced and a 900m extra pipeline was laid to supply potable water to the community. The silted pond of the village was cleaned and recharged by desilting it. Large quantity of silt was removed paving way to large quantity of water so that it recharged the aquifers. Rainwater harvesting structures have been constructed at different places which has helped in diluting the contaminants of the groundwater after the monsoons. 1000 trees have also been planted which have improved the environment.

© NCERT not to be republished

health hazards. These wastes should be treated as resource and utilised for generating energy and compost. Untreated wastes ferment slowly and release toxic biogas to the atmosphere, including methane.

Activity

What do we throw away? Why?

Where does our waste end up?

Why do ragpickers sort out rubbish dumps? Does it have some value?

Is our urban waste worth anything?

Fig. 9.3 : A view of urban waste in Mahim, Mumbai

Rural–Urban Migration

Population flow from rural to urban areas is caused by many factors, like high demand for labour in urban areas, low job opportunities in rural areas and unbalanced pattern of development between urban and rural areas. In India, population in cities is rapidly increasing. Due to low opportunities in smaller and medium cities, the poor people generally bypass these small cities and directly come to the mega cities for their livelihood.

A case study given below to have better understanding of the subject. Read it carefully and try to comprehend the process of rural urban migration.

A Case Study

Ramesh has been working in contract as a welder on construction site in Talcher (coal region of Odisha) for the last two years. He moved with the contractor to various places like Surat, Mumbai, Gandhi Nagar, Bharuch, Jamnagar and so on. He remits Rs. 20,000 per year to his father in his native village. The remittances have been mainly used for daily consumption, healthcare, schooling of children, etc. Part of the money is also used in agriculture, purchasing of land and building of houses, etc. The standard of living of Ramesh's family improved significantly.

Fifteen years ago, the situation was not the same. The family was passing through very tough times. Three of his brothers and their families had to survive on three acres of land. The family was highly in debt. Ramesh had to discontinue his studies after ninth standard. He was further hard pressed when he got married.

Do You Know ?

At present, 55 per cent of the world's population lives in cities and more will join them in near future. This proportion is estimated to go up to 68 per cent by 2050. That will put pressure on governments to make urban areas better places to live with optimum infrastructure facilities for desirable quality of life.

Urban population grows as a result of natural increase (when birth rate exceeds death rate), net in-migration (when people move in than out), and sometimes reclassification of urban areas to encompass formerly rural population settlements. In India, it is estimated that after 1961 around 60 per cent of the urban growth has been attributed and about 29 per cent of them from rural areas to urban migration.

© NCERT not to be republished

Simultaneously, he was also impressed by some successful out-migrants of his village who had been working in Ludhiana and supporting their families in village by sending money and some consumer goods. Thus, due to abject poverty in the family and perceived job promises at Ludhiana, he made a move to Punjab with his friend. He worked there in a woolen factory for six months at the rate of only Rs. 20 per day in 1988. Apart from the crisis of managing his personal expenditure from this meagre income, he was also facing difficulty in assimilation to the new culture and environment. Then he decided to change his place of work from Ludhiana to Surat under the guidance of his friend. He learnt the skills of welding in Surat and after that he has been moving to different places with the same contractor. Though the economic condition of Ramesh's family at village improved, he is bearing the pain of separation of his near and dear ones. He cannot shift them with him, as the job is temporary and transferable.

Comments

In developing countries, poor, semi-illiterate and the unskilled like Ramesh migrating from rural areas frequently end up performing menial jobs at low wages in informal sector in urban areas. Since wages are very low to support the family at the place of destination, the spouses are left behind in rural areas to look after children and elderly people. Thus, the rural-urban migration stream is dominated by the males.

Problems of Slums

The concept "Urban or Urban Centre" is defined in settlement geography to differentiate it from the "Rural" about which you have learnt in some previous chapters of this book. You have also learnt in the book entitled *"Fundamentals of Human Geography"* that this concept is defined differently in different countries.

Both urban and rural settlements are different in their functions, sometimes,

'Slum-dwellers are the backbone of labour force'

झुग्गियों व फैक्टरी में आग, दो हताहत

...और अब धधक उठा पेट

झुग्गीवालों को सावदा घेवरा में फ्लैट

वसंत कुंज की झुग्गियों में लगी आग

राख में कुरेदते उम्मीद

Can a slum become a world class township?

What is the motive for a new slum redevelopment plan for Dharavi? Will people like the potter and the cobbler be given their due?

Have you visited a slum? Visit a slum in your city, and write about the problems faced by slum dwellers.

Reprint 2026-27

Dharavi–Asia's Largest Slum

"…. Buses merely skirt the periphery. Autorickshaws cannot go there, Dharavi is part of central Bombay where three wheelers are banned.

Only one main road traverses the slum, the miscalled 'ninety-foot road', which has been reduced to less than half of that for most of its length. Some of the side alleys and lanes are so narrow that not

even a bicycle can pass. The whole neighbourhood consists of temporary buildings, two or three storeyed high with rusty iron stairways to the upper part, where a single room is rented by a whole family, sometimes accommodating twelve or more people; it is a kind of tropical version of the industrial dwelling of Victorian London's East End.

But Dharavi is a keeper of more sombre secrets than the revulsion it inspires in the rich; a revulsion, moreover, that is, in direct proportion to the role it serves in the creation of the wealth of Bombay. In this place of shadowless, treeless sunlight, uncollected garbage, stagnant pools of foul water, where the only non-human creatures are the shining black crows and long grey rats, some of the most beautiful, valuable and useful articles in India are made. From Dharavi come delicate ceramics and pottery, exquisite embroidery and zari work, sophisticated leather goods, high-fashion garments, finely-wrought metalwork, delicate jewellery settings, wood carvings and furniture that would find its way into the richest houses, both in India and abroad…

Dharavi was an arm of the sea, that was filled by waste, largely produced by the people who have come to live there: Scheduled Castes and poor Muslims. It comprises rambling buildings of corrugated metal, 20 metres high in places, used for the treatment of hides and tanning. There are pleasant parts, but rotting garbage is everywhere…"

(Seabrook, 1996, pp. 50, 51-52)

complementing each other. Apart from these, rural and urban areas have also emerged into two separate cultural, social, political, economic and technological divide.

India, which has a predominance of rural population (approximately 69 per cent of the total population in 2011) and where villages were considered the ideal republics by

Reprint 2026-27

Mahatma Gandhi, most of the rural areas are still poor performing primary activities. Here most of the villages exist as appendix to the core urban centre forming its hinterland.

This may give an impression that urban centres exist as undifferentiated homogeneous entities in opposition to the rural areas. On the contrary, urban centres in India are more differentiated in terms of the socio-economic, politico-cultural and other indicators of development than any other areas. At the top, there are farm houses and high income group localities characterised by well-developed urban infrastructures, like wide roads, streetlights, water and sanitation facilities, lawns, well-developed green belt, parks, playgrounds and provisions for individual security and right to privacy. At the other extreme of it are the *slums*, *jhuggi-jhopari* clusters and colonies of shanty structures. These are inhabited by those people who were forced to migrate from the rural areas to these urban centres in search of livelihood but could not afford proper housing due to high rent and high costs of land. They occupy environmentally incompatible and degraded areas.

Slums are residential areas of the least choice, dilapidated houses, poor hygienic conditions, poor ventilation, lack of basic amenities, like drinking water, light and toilet facilities, etc. Open defecation, unregulated drainage system and overcrowded narrow street patterns are serious health and socio-environmental hazards.

The *Swachh Bharat Mission* (SBM) is part of the urban renewal mission launched by the Government of India to improve the quality of life in urban slums.

Moreover, most of the slum population works in low-paid, high risk-prone, unorganised sectors of the urban economy. Consequently, they are the undernourished, prone to different types of diseases and illness and can not afford to give proper education to their children. The poverty makes them vulnerable to drug abuse, alcoholism, crime, vandalism, escapism, apathy and ultimately social exclusion.

Why are the children of slum-dwellers deprived of school education?

Land Degradation

The pressure on agricultural land increases not only due to the limited availability but also by deterioration of quality of agricultural land. Soil erosion, waterlogging, salinisation and alkalinisation of land lead to land degradation. What happens if land is consistently used without managing its fertility? Land is degraded and productivity declines. Land degradation is generally understood either as a temporary or a permanent decline in productive capacity of the land.

Though all degraded land may not be wasteland, but unchecked process of degradation may lead to the conversion to wasteland.

There are two processes that induce land degradation. These are natural and created by human beings. National Remote Sensing Centre (NRSC) has classified wastelands by using remote sensing techniques and it is possible to categorise these wastelands according to the processes that have created them. There are a few types of wastelands such as gullied /ravinous land, desertic or coastal sands, barren rocky areas, steep sloping land, and glacial areas, which are primarily caused by *natural* agents. There are other types of degraded lands such as waterlogged and marshy areas, land affected by salinity and alkalinity and land with or without scrub, which have largely been caused by *natural as well as human factors.* There are some other types of wastelands such as degraded shifting cultivation area, degraded land under plantation crops, degraded forests, degraded pastures, and mining and industrial wastelands,

© NCERT not to be republished

are caused by human action. Table 12.3 indicates that wastelands caused by man-made processes are more important than natural processes.

A Case Study

Jhabua district is located in the westernmost agro-climatic zone in Madhya Pradesh. It is, in fact, one of the five most backward districts of the country. It is characterised by high concentration of tribal population (mostly *Bhils*). The people suffer due to poverty which has been accentuated by the high rate of resource degradation, both forest and land. The watershed management programmes funded by both the ministries of "Rural Development" and "Agriculture", Government of India, have been successfully implemented in Jhabua district which has gone a long way in preventing land degradation and improving soil quality. Watershed Management Programmes acknowledge the linkage between land, water and vegetation and attempts to improve livelihoods of people through natural resource management and community participation. In the past five years, the programmes funded by the Ministry of Rural Development alone *(implemented by Rajiv Gandhi Mission for Watershed Management)* has treated 20 per cent of the total area under Jhabua district.

The Petlawad block of Jhabua is located in the northernmost part of the district and represents an interesting and successful case of Government-NGO partnership and community participation in managing watershed programmes. The *Bhils* in Petlawad block, for example, (Sat Rundi hamlet of Karravat village) through their own efforts, have revitalised large parts of common property resources. Each household planted and maintained one tree on the common property. They also have planted fodder grass on the pasture land and adopted social-fencing of these lands for at least two years. Even after that, they say, there would be no open grazing on these lands, but stall feeding of cattle, and they are thus confident that the pastures they have developed would sustain their cattle in future.

An interesting aspect of this experience is that before the community embarked upon the process of management of the pasture, there was encroachment on this land by a villager from an adjoining village. The villagers called the tehsildar to ascertain the rights of the common land. The ensuing conflict was tackled by the villagers by offering to make the defaulter encroaching on the CPR a member of their user group and sharing the benefits of greening the common lands/ pastures. (See the section on CPR in chapter 'Land Resources and Agriculture').

Fig. 9.4 : Trees planted on Common Property Resources in Jhabua

Source: Evaluation Report, Rajiv Gandhi Mission for Watershed Management, Government of Madhya Pradesh, 2002

Fig. 9.5 : Community Participation for Land Leveling in Common Property Resources in Jhabua (ASA, 2004)

© NCERT not to be republished

EXERCISES

1. Choose the right answers of the following from the given options.

(i) Which one of the following river is highly polluted?

(a) Brahmaputra (c) Yamuna

(b) Satluj (d) Godavari

(ii) Which one of the following deseases is caused by water pollution?

(a) Conjunctivitis (c) Respiratory infections

(b) Diarrhorea (d) Bronchitis

(iii) Which one of the following is the cause of acid rain?

(a) Water pollution (c) Noise pollution

(b) Land pollution (d) Air pollution

(iv) Push and pull factors are responsible for–

(a) Migration (c) Slums

(b) Land degradation (d) Air pollution

2. Answer the following questions in about 30 words.

(i) What is the difference between pollution and pollutants?

(ii) Describe the major source of air pollution.

(iii) Mention major problems associated with urban waste disposal in India.

(iv) What are the effects of air pollution on human health.

3. Answer the following questions in about 150 words.

(i) Describe the nature of water pollution in India.

(ii) Describe the problem of slums in India.

(iii) Suggest measures for reduction of land degradation.

© NCERT not to be republished

Reprint 2026-27